THE Journal

OF THE AMERICAN DENTAL ASSOCIATION

JULY

1955

CONTENTS

Roentgen ray injuries to dentists—Young 1
Need for precaution in dental roentgenography—Spear 7
Protection and dental roentgenographic equipment—Smith ... 12
New local anesthetics containing propoxycaine—Tainter 19
Cephalometric headplate measurement—Schoenwetter 27
Incidence of the small dens in dente—Amos 31
Cementation and esthetics in crown and bridge—Sullivan 34
Fixed splint and bridge assembly—Winslow 47
Use of mephenesin in cerebral palsy patients—Album 51
Revision of A.D.A. specification no. 3—Stanford 56
The self-employed dentist and O.A.S.I.—Conway 65
Cases and comments 69
Reports of councils and bureaus 73
Editorials 87
News of dentistry 94
Book reviews 113
Current literature 122
Deaths 129
Directory 133
Announcements 135

NINETY-SIXTH ANNUAL SESSION

SAN FRANCISCO • OCT. 17-20

An outstanding scientific meeting awaits you
in the setting of one of the world's
most fascinating cities. You will never forget
nor regret a trip to this west coast metropolis.
There are ample accommodations for all
. . . so bring your whole family.

Make reservations now!

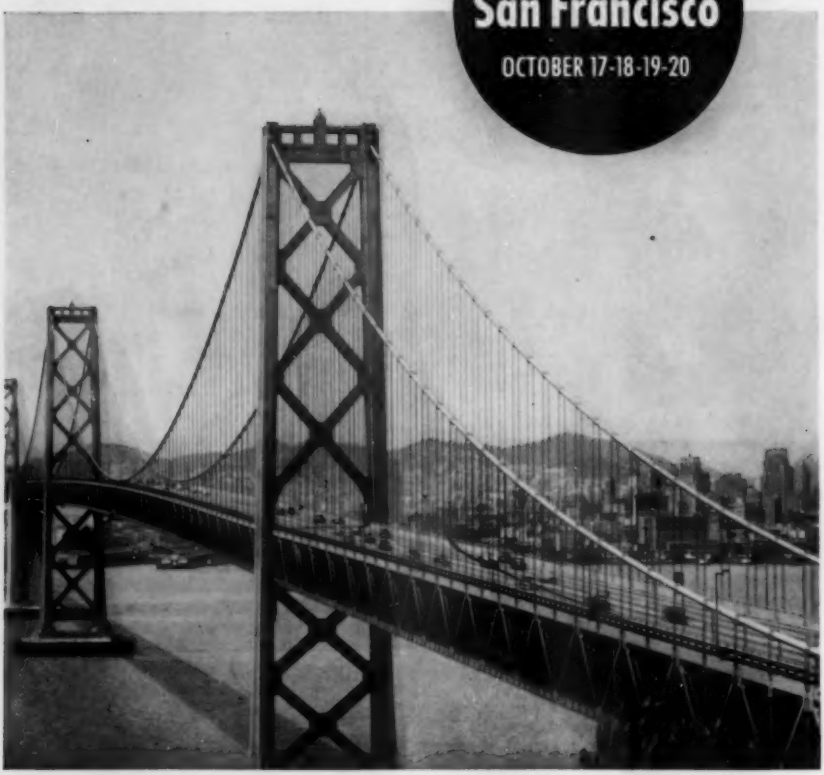
(Use the official application form in your A.D.A. Journal)

AMERICAN DENTAL ASSOCIATION

96th Annual Session

San Francisco

OCTOBER 17-18-19-20



The Journal of the American Dental Association is published monthly by the American Dental Association at 222 E. Superior St., Chicago 11, Ill. Printed in U.S.A. Second class mail privileges authorized at Chicago, Ill. Subscription $7.00 a year in U.S.A.; $8.00 foreign. Issue of July, 1955, Vol. 51, No. 1. Copyright 1955 by the American Dental Association.

FOCUS on these 3 JELENKO GOLDS

Note Jelenko-Sherer Attachments used as inlacks without springs.

JELENKO NO. 7 CAST GOLD

For Long Span Stationary Bridges and their Abutments.

per dwt. **$2.15**

FIRMILAY TYPE C HARD*

For Short Span Stationary Bridges and their Abutments, when heat hardened.

per dwt. **$2.15**

MODULAY TYPE S M'D H'D*

For M.O.D. and Simple Inlays, not used as abutments. Holds form well under occlusal abrasion yet is easily burnished.

per dwt. **$2.05**

*Certified to Meet A.D.A. Specification No. 5.

Cast by THERMOTROL

J. F. Jelenko & Co., Inc.

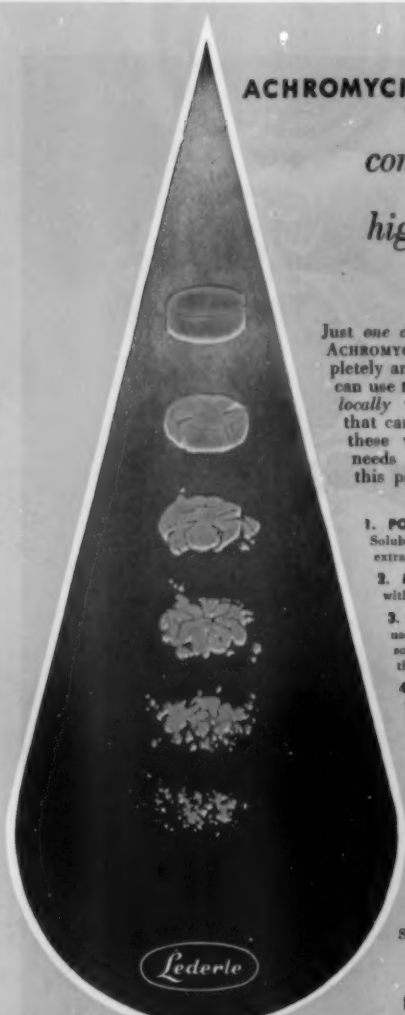
136 West 52nd Street • New York 19, U. S. A.

"DIAMOND-HARD SUPER TUNGSTEN CARBIDE"

BUSCH-WIDIA

burs are made of the hardest of the tungsten carbides to add to the recognized advantages of BUSCH BUR BALANCED BLADE DESIGN and their high standards of precision manufacture. BUSCH-WIDIA BURS—second only to diamonds in hardness—are your full assurance of peak performance during their prolonged service. Busch Burs and Busch-Widia Burs are available through your dealer.

PFINGST & COMPANY, INC. • 62 COOPER SQUARE • NEW YORK CITY



ACHROMYCIN SOLUBLE TABLETS
(TETRACYCLINE)

completely soluble!

highly useful!

Just *one drop* of water is sufficient to place an ACHROMYCIN Tetracycline Soluble Tablet completely and quickly in solution. That means you can use this renowned broad-spectrum antibiotic *locally* without fear of undissolved particles that can cause foreign-body reactions. In fact, these versatile tablets fill *several* important needs in your daily practice! Just look at this partial list:

1. **POSTEXTRACTION SOCKETS.** Place ACHROMYCIN Soluble Tablet intact in socket immediately after extraction.
2. **MEDICATED PACKS.** Impregnate cotton rolls with solution made from tablet(s).
3. **ROOT CANAL THERAPY.** After apicoectomy use Achromycin Soluble Tablet intact or make solution for irrigation; solution will readily pass through 20 to 25 gauge needles.
4. **SYSTEMIC THERAPY for CHILDREN.** ACHROMYCIN Soluble Tablets are easily dissolved in milk, fruit juices and other liquids.
5. **MOUTH WASHES.** Prescribe Tablets for patient's use in chronic disorders such as Aphthous Stomatitis.

ACHROMYCIN Soluble Tablets 50 mg. are available from your usual source of supply in bottles of 40 and 100. They do not require refrigeration. Order a supply today!

FREE For your convenience in prescribing ACHROMYCIN, Lederle has prepared special prescription pads. Write for yours!

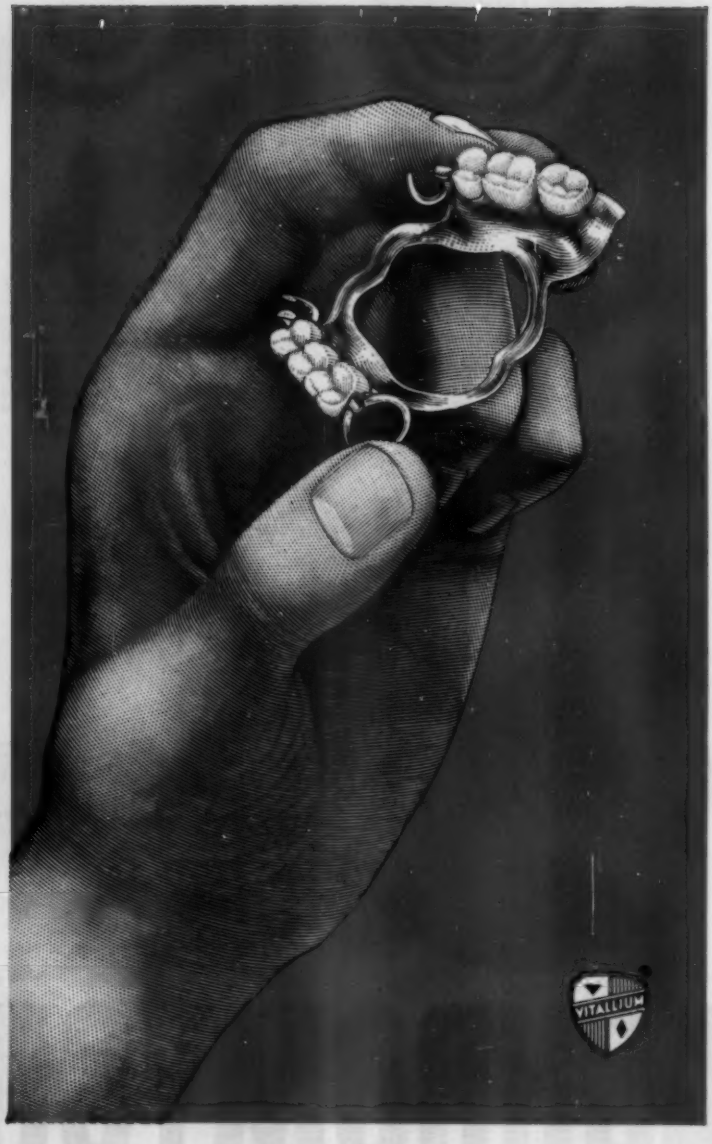
Capsules: 250, 100, and 50 mg.
Soluble Tablets: 50 mg.

*REG. U.S. PAT. OFF.

LEDERLE LABORATORIES DIVISION
AMERICAN CYANAMID COMPANY Pearl River, New York

ACHROMYCIN*

AN AID TO, NOT A SUBSTITUTE FOR, GOOD DENTISTRY


VITALLIUM

Crafted by leading laboratories

VITALLIUM® RESTORATIONS

For over 20 years Vitallium restorations have been designed and produced in leading laboratories the country over. This is assurance to you of the superior qualities of Vitallium restorations, for these laboratories know they cannot afford to provide you with less than the best in materials and service. The tested and certified alloy, coupled with quality-controlled procedures, enables them to provide the profession with cast full and partial dentures that excel in comfortable fit, efficient function and long, useful life.

AUSTENAL LABORATORIES, INC.
NEW YORK CHICAGO

© By Austenal Laboratories, Inc.

USED MORE SUCCESSFULLY FOR MORE PATIENTS

than any other impression material

For full and partial impressions, dentists' purchases indicate a decided preference for Jeltrate. Here, in brief, are the reasons —

Desirable setting time
Strength quickly developed
No broken teeth
Clean, hard surface on cast
No fixing needed to maintain accuracy

Only $4.00 for the bulk can containing material sufficient for 51 one-scoop mixes, 25 two-scoop mixes (average), or 17 three-scoop mixes. Case of 8 cans, $28.00 Individual pouches also available.

Jeltrate

... the unique alginate impression material by **CAULK**

New! inlay Jeltrate

Combines the accuracy of hydrocolloids with the convenience of Jeltrate. Contrasting pink color. Longer working time. Ask your dealer about the special introductory package.

"American Dental Association Specifications for Dental Materials"

is a new publication that will be of interest to every dentist. Sponsored by the Council on Dental Research of the American Dental Association, the first annual edition is now available at $1.00 a copy and contains 76 pages dealing with the work of the Fellowship Division of the Council on Dental Research, American Dental Association, at the National Bureau of Standards. Included in the contents are:

- The proper handling of dental materials.
- All 12 Association specifications for dental materials.
- The list of certified dental materials.
- Bibliography of publications and motion pictures on dental research conducted at the Bureau.
- The certification program for dental materials.

Dental schools, dental research laboratories and dental manufacturers, as well as practicing dentists, will find "American Dental Association Specifications for Dental Materials" a handy and valuable reference book. Assure yourself a copy by sending in your order today. Use the handy coupon below.

Order Department, AMERICAN DENTAL ASSOCIATION
222 East Superior Street, Chicago 11, Illinois

☐ Please enter my order for ..... copies of (Catalogue No. P-7). Specifications for Dental Material, 1955 edition at $1.00 per copy. My remittance of $..... is enclosed.

☐ Please notify me by mail each year when Specifications for Dental Material is available. I understand there is no charge for this service.

please type or print

Name .....

Address .....

City, zone & state.....

the *Perfected* zinc oxide

quick setting, strong

S.S.WHITE

Z·O·E

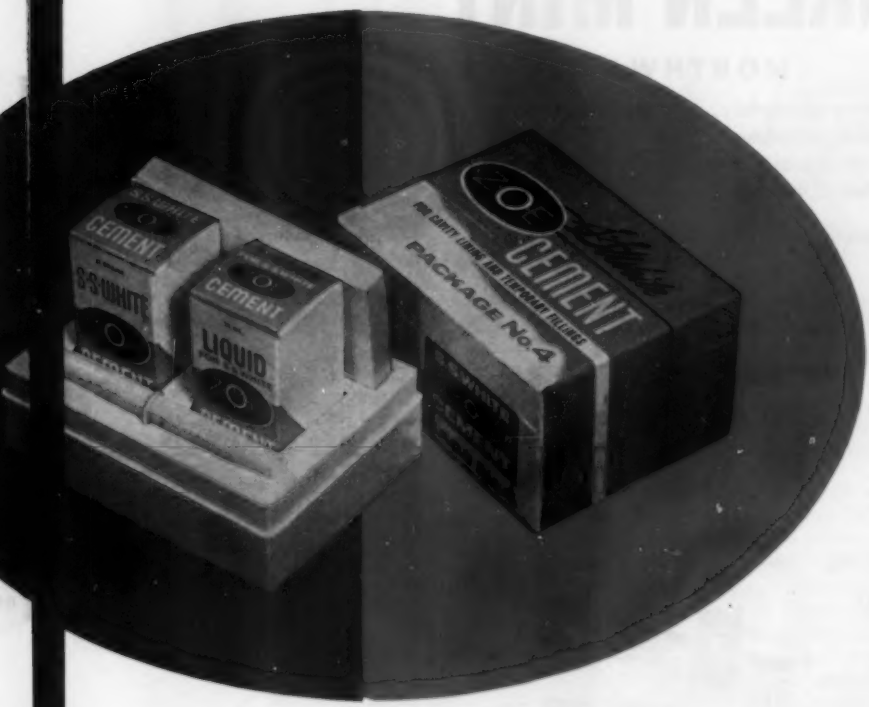
CEMENT

Z.O.E. Cement sets in 6 to 8 minutes. Setting time does not change with age! Used for cavity linings, filling can follow immediately. It also makes an excellent, temporary filling. Z.O.E. is good, too, for dressing seal. This improved Zinc Oxide Eugenol preparation spatulates readily, does not cling to dampened cotton pellets, and adheres firmly to cavity walls. After setting, it cuts cleanly. It is easy to remove and has a soothing effect on pulp. Ideal for lining posterior and anterior cavities except under acrylic fillings. You will like the superior results you obtain with Z.O.E.

THE S. S. WHITE DENTAL MFG. CO.

eugenol cement for cavity lining

enough for temporary fillings



This compact Z.O.E. Package No. 4 contains powder, liquid, mixing pad and powder measure. Price—$3.00

These items can be bought individually as follows:

Powder	$1.80 per bottle
Liquid	1.15 per bottle
Mixing Pads	.40 per pad

PHILADELPHIA 5, PA.

Refreshing as a breath of Spring—

GREEN MINT

MOUTHWASH

- tastes wonderful . . . no "medicated" flavor
- really refreshing
- available at all drug counters
- ideal at the chair

HUDSON PRODUCTS • JERSEY CITY 2, N. J.

CONDIT'S AMMONIACAL SILVER NITRATE

THE PERFECT CARRIER FOR FORMALIN

#6

Operating Outfit

Tray and dishes of clear Lucite.

Be sure it is the ORIGINAL

HIGH PURITY AND CLOSE CHEMICAL TOLERANCES

P. N. CONDIT

Boston 59, Massachusetts

NEW!

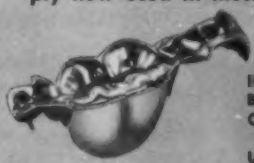
BAKER Deoxidized CASTING Golds

You will immediately see the difference in golds made by the Baker Deoxidizing Process.

They melt, cast and finish easier, cleaner and much denser —especially when using the new natural or mixed gas supply now used in most cities.

Castings made of these adjusted alloys are so free from microscopic surface porosity that they are exceptionally resistant to all mouth tarnish. A small trial order from your dealer will convince you.

SEND FOR PHYSICAL PROPERTIES CHART, DESCRIPTIVE LITERATURE AND PRICE LIST.



BAKER DEOXIDIZED GOLDS ARE AVAILABLE IN . . .

INLAY SOFT A • INLAY MEDIUM B • INLAY HARD C

BAKER 75—*extra hard rich color bridge gold*

CHICAGO 4—all purpose partial and removable bridge gold

UNICAST—popular all purpose economy gold

BAKER & CO., INC.

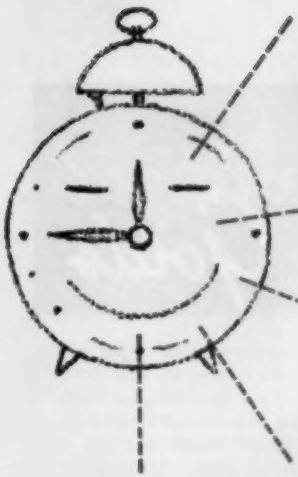
850 PASSAIC AVENUE • EAST NEWARK, N. J.

NEW YORK CITY 30 Church St. • **CHICAGO** 55 E. Washington Street • **SAN FRANCISCO** 760 Market Street

BAKER

THE WORLD'S LARGEST WORKERS AND REFINERS OF PRECIOUS METALS

NO NEED TO WORK LONGER HOURS TO SERVE MORE PATIENTS



COE-FLEX, the rubber type impression cream, possesses an accuracy and dimensional stability unequalled by any hydrocolloid material—takes impressions RIGHT *the first time!*

And it is SAFE to use . . . when dispatching your impressions to a laboratory. Pouring of the cast can be SAFELY delayed without affecting the accuracy of the impression.

Models and dies can be made from COE-FLEX impressions and appliances completed ready for insertion—thus eliminating the usual appointment for try-in!

COE-FLEX is not only easy to mix and use but its dependability speeds up impression taking, avoids "Take-OVERS," conserves chair-time!

Because COE-FLEX is ideal for impressions of inlays, fixed bridges AND partials, you require only 1 impression material—avoid waste, save money, conserve hours!

And COE-FLEX is inexpensive. Package complete with directions, only $5.00. . . . 3 packages, $4.50 per pkg. At your dealer's.

COE LABORATORIES, INC.
CHICAGO 21, ILL.

THE AMERICAN DENTAL ASSOCIATION

Announces a new publication

DENTAL ABSTRACTS

to be published monthly beginning January 1956 at the low annual subscription price of $6.00 for U. S. subscriptions; foreign $7.00.

DENTAL ABSTRACTS has a dual purpose: (1) to provide, by a few hours' reading each month, a survey of the significant advances being made by dentistry throughout the world, as reflected in current dental literature; and (2) to supply enough data in each abstract so that the reader may be encouraged to refer to the original article for more complete information.

DENTAL ABSTRACTS will enable every dentist to keep informed on dental progress everywhere. It will be particularly helpful to those—general practitioners, researchers, educators, technicians and manufacturers, to mention a few—who require a knowledge of more than one field in dentistry. All will find DENTAL ABSTRACTS the answer to a long felt need.

For easy reference DENTAL ABSTRACTS will be divided into these eight major sections:

Preventive and Public Health Dentistry
Basic Science
Periodontics and Endodontics
Operative Dentistry
Prosthetic Dentistry
Oral Surgery
Orthodontics
Professional Activities

The entire dental literature will be covered under these eight heads. So, be sure you're not disappointed! Send in your order and check today. The convenient order form below is for your use.

AMERICAN DENTAL ASSOCIATION, Subscription Dept.
222 East Superior Street, Chicago 11, Illinois

Please enter my subscription to DENTAL ABSTRACTS for 1 year. My check is enclosed.* I understand that the first issue will be January 1956.

please type or print

Name .....

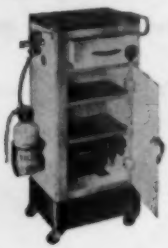
Address .....

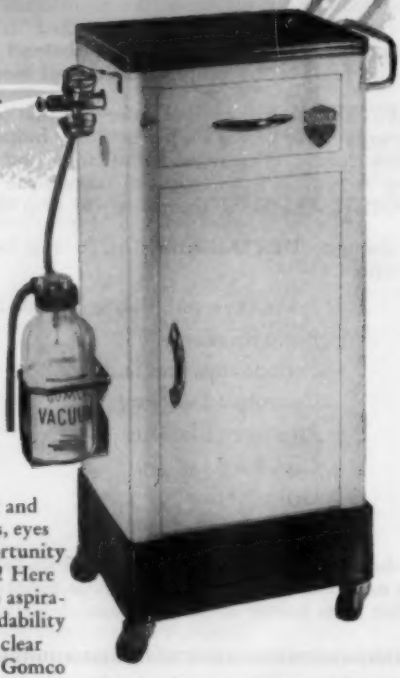
City, zone & state.....

*Subscriptions: $6 for U. S.; foreign $7.00.

YOUR PRACTICE
DESERVES THE FINEST
ASPIRATOR SERVICE

GOMCO No. 796
CABINET
ASPIRATOR





Here is aspiration so convenient and effective that it gives hands, eyes and mind the freedom and opportunity to do the best possible work! Here is the strong, controlled Gomco aspiration so well known for dependability in keeping the operating field clear and clean. And here, in the Gomco No. 796, is a spotless, clean-lined cabinet aspirator with accessories drawer, extra shelf space, extra working space on top and near-silent precision Gomco pump inside. The ultimate in aspirator service is within reach of every practitioner. Ask your Gomco dealer for details.

GOMCO SURGICAL MANUFACTURING CORP.
824-D E. Ferry Street, Buffalo, New York

Suction, Suction-Ether, and Suction-Pressure Pumps
Thermotic Drainage Pumps ***Thoracic Pumps***
Aerosol Penicillin Pumps
Dental Aspirators ***Tidal Irrigators***

The Improved
ODONTOGRAPHIC ALLOY

adds up

to dense, durable amalgam fillings with excellent uniform results every time

By eliminating volatilization, the Odontographic Process keeps intact the properly balanced proportions of the formula.

Smooth-working. Polishes to a hard brilliant finish.

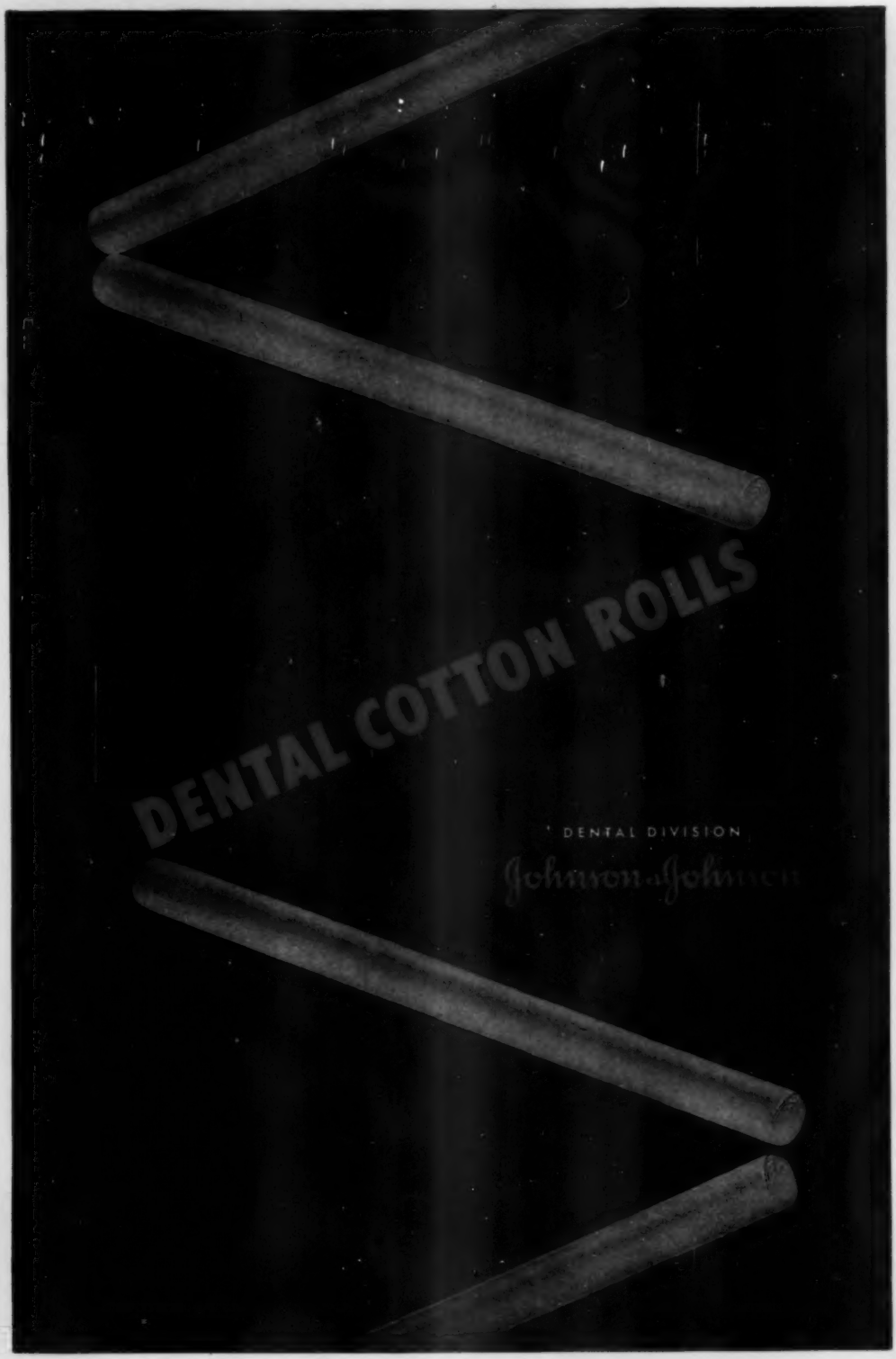
Complies with A.D.A. specifications

ODONTOGRAPHIC

IMPROVED ALLOY AND MERCURY

Alloy Manufacturers since 1907

ODONTOGRAPHIC MFG. CO., INC.
62 COOPER SQUARE • NEW YORK 3, N.Y.


DENTAL COTTON ROLLS
DENTAL DIVISION
Johnson & Johnson

JULY 1955

THE Journal OF THE AMERICAN DENTAL ASSOCIATION

VOLUME 51 • NUMBER 1

Diagnosis, treatment and prognosis of roentgen ray injuries to dentists

H. Herman Young, M.D., and Melvin G. Kunkel,† M.D., Rochester, Minn.*

In November 1895, Wilhelm Konrad von Röntgen announced his discovery of the roentgen ray. Within a year there were reports of erythema, dermatitis and ulcerations as a result of roentgen ray exposure.[1] The first malignancy definitely attributable to the use of roentgen rays was reported within seven years.[2, 3]

An occasional patient is still seen who is suffering from injuries received in the pioneer years of the use of the roentgen ray. The days of ignorance as to protection, however, should be over. Calibration of machines, indications for treatment and recognition of cumulative dose are now matters of common knowledge. With the exception of changes due to intentionally administered massive doses, radiation injuries may be prevented.

The problem of roentgen ray injury to the dentist is similar to that of such injury to the physician. Too often the only qualification deemed necessary to practice roentgenology is the possession of roentgenologic apparatus. Even if the average physician or dentist takes the time and trouble to acquaint himself with the hazards of roentgen ray exposure and the means of prevention, he only too frequently forgets what he has learned or develops a daredevil disregard for the danger. It is the attitude that "just one more exposure will not hurt me" which leads to difficulty. The onset of changes

Presented as part of a panel discussion "Hazards of Roentgenology in Dentistry" before the Sections on Roentgenology and Research, ninety-fifth annual session, American Dental Association, Miami, Fla., November 10, 1954.

*Section of Orthopaedic Surgery, Mayo Clinic and Mayo Foundation, graduate school, University of Minnesota.

†Fellow in Orthopaedic Surgery, Mayo Foundation, graduate school, University of Minnesota.

1. Marcuse, Wilhelm. Dermatitis und Alopecia nach Durchleuchtungsversuchen mit Röntgenstrahlen. Deutsche med. Wchnschr. 22:481 July 23, 1896.

2. Haagensen, C. D. Occupational neoplastic disease. Am. J. Cancer 15:641 April 1931.

3. Silverstone, S. M. Radiation cancer. J. Mt. Sinai Hosp. 9:74 July-Aug. 1942.

in the skin is frequently so insidious that irreparable damage is often done before the condition is recognized.

At the Mayo Clinic 140 physicians, 52 dentists, 1 osteopath and 1 physician's wife in whom roentgen ray dermatitis of the hands developed as a result of their occupational exposure to roentgen rays have been seen. The wife of the physician was acting as his roentgenologic technician. The youngest physician so injured was 29 years of age, and the oldest was 75 at the time they were first examined at the Mayo Clinic. The average age of the physicians was 55 years. The youngest dentist with roentgen ray dermatitis was 34 years of age and the oldest was 66 years. The average age of this group was 52 years.

Whereas most physicians received roentgen ray injuries through making prolonged fluoroscopic examinations without proper precautions being taken against overexposure, the dental group received their injuries by holding the films in the mouths of patients while getting roentgenograms of the teeth. In the latter group it was the index finger and thumb of one or both hands that were most frequently involved.

Of the group of 194 patients with chronic roentgen ray dermatitis of the hands, 61, or 31 per cent, experienced malignant degeneration of the lesion. Although only one physician and one dentist are known to have died as a result of the disease, others must have succumbed, for metastases were present in two physicians and three dentists at the time of their examination.

EFFECTS OF RADIATION

Radiation causes the ionization of tissues, and the ionization of even a single atom of the complex protein molecules which make up protoplasm may disrupt the entire molecule.[4] If severe enough damage is done by a high enough dose of radiation, then whole tissues may be destroyed. There is no evidence from tissue culture experiments that radiation ever stimulates cell growth. The effect of all radiation is one of cellular injury.

Physiologic and reproductive activities characterize the living cell. The reproductive activity is more readily affected by radiation than the physiologic one. If sufficient damage is done to its nuclear chromosomes, death of a cell will occur but only at the time of its next division when the daughter cells die because of the lack of chromosome material. Actively dividing cells are thus more readily destroyed than slowly dividing ones.

One of the most important aspects of acute or chronic roentgen ray dermatitis is the effect of the radiation on the blood and lymphatic vessels. The changes are greatest in the small veins and capillaries, but all vessels show some endothelial changes. The vessels dilate and the endothelial cells lining their walls become swollen and their nuclei enlarged. This rapidly leads to reduction in the lumen of the vessel with resultant thrombosis and changes similar to those of endarteritis obliterans. When a sufficiently large dose of radiation has been received, either as a single dose or by accumulation, the final result, even after all other reaction has apparently died down, is decreased vascularity of the tissue. This explains why the skin is so susceptible to injury and late necrosis. It also explains the difficulty encountered in the surgical management of roentgen ray dermatitis. No tissue can live without a blood supply, and unless it can be obtained, all surgical procedures will fail.

ACUTE ROENTGEN RAY DERMATITIS

An overdose of radiation of the skin results in either acute or chronic roentgen ray dermatitis. Whether the condition is

4. Levitt, W. M. Handbook of radiotherapy for senior and post-graduate students. New York, Paul B. Hoeber, Inc., Harper & Brothers, 1952.

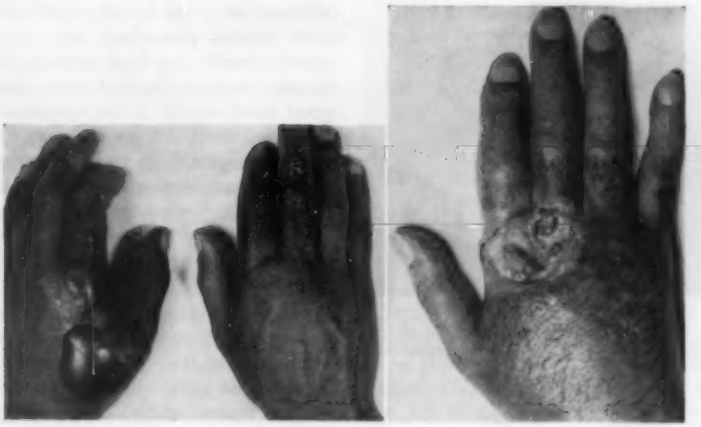


Fig. 1 • Acute roentgen ray dermatitis. Left: Second degree. Note blisters and bullae. Right: Third degree

acute or chronic depends on the manner in which the overdose is received. The acute reaction may be due to a single massive dose, intentional or otherwise, or to several exposures at short intervals. It may be an expected reaction which accompanies massive irradiation used in an attempt to eradicate an underlying malignant growth, and in such a situation it is a justifiable occurrence. Too often, however, an acute radiation burn follows a prolonged fluoroscopic examination or an accidentally delivered overdose; it is these instances that should be avoided.

Acute roentgen ray dermatitis develops after an asymptomatic latent period of several days. For the sake of uniformity these reactions may be classified as of first, second and third degree, just as other burns are. A first degree reaction is one that produces erythema of the skin of varying degree; a second degree reaction also is characterized by erythema, but in addition blisters and bullae are present (Fig. 1, left); a third degree reaction is a true burn of the entire thickness of the skin with loss of subcutaneous tissue and the formation of an indolent ulcer (Fig. 1, right).

Acute roentgen ray dermatitis of the first and second degrees will progress to normal healing, provided care is exercised to avoid further irritation of the burned area with the production of deeper burns or even ulcers. Stimulating or irritating medications should be avoided, and only bland, soothing applications should be used in treatment. Cold saline or boric acid compresses, cold cream or bland oily lotions usually are sufficient to soothe the burned area while healing occurs. Occasionally topical anesthetic ointments may be used to alleviate pain, and in slowly healing areas the use of Aloe vera leaf[5] or chlorophyll ointment may influence healing favorably.

As the erythema gradually disappears from the areas with first and second degree burns, it is replaced by brown pigmentation of the skin similar to the tan-

5. Collins, C. E., and Collins, Creston. Roentgen dermatitis treated with fresh whole leaf of Aloe vera. Am. J. Roentgenol. 33:396 March 1935.

Fig. 2 • Left: Actinodermatitis of sole of foot, third degree. Right: Postoperative repair with pedicle skin graft

ning that follows sunburn. This tanning may be permanent or may fade slowly. The skin in these areas, however, will always remain thin and atrophic, and sweat gland activity will always remain depressed. Telangiectatic areas gradually appear and are usually present within a year from the time the burn was sustained. Barring further assault or trauma, these healed areas give no further trouble and no cause for concern.

The treatment and prognosis of third degree acute roentgen ray dermatitis are not as simple as in first and second degree reactions. In areas with third degree burns, the entire thickness of the dermis together with more or less of the subcutaneous tissue becomes necrotic. A brawny, dry necrotic slough occurs in the burned area. This slough is slow to separate, and when removed, leaves an ulcer with a grayish yellow, unhealthy appearing base. Tendons, joints, bone and other underlying structures may be exposed and ultimately may sequestrate.

Treatment of the third degree radiation burn frequently taxes the ingenuity of the surgeon.[6] It must be recognized that certain irreversible changes have occurred in the tissues resulting in loss of reparative power. Occlusion of blood vessels has produced local ischemia, and without adequate blood supply any surgical repair procedure will fail. The ulcers usually are best treated by wide excision back to normal tissue and by a good blood supply. If the resultant defect is not too deep, if tendons, bones or joints are not exposed, if weight-bearing surfaces are not involved and if a good circulation has been established throughout the region, the site occasionally may be covered with a split-skin graft with reasonable hope of success. If, on the other hand, the defect is deep, with tendon and bone exposed, or if the palm of the hand or the sole of the foot is involved, then a pedicle skin graft must be prepared and used to replace the ulcer and the excised tissue (Fig. 2).

CHRONIC ROENTGEN RAY DERMATITIS

Whereas acute roentgen ray dermatitis is the result of a single massive dose or frequent doses at short intervals, chronic roentgen ray dermatitis is the result of many exposures over a long time. This chronic form may be observed after the treatment of such conditions as acne, psoriasis and warts, but is most frequently observed on the hands of physicians and dentists who are doing roentgenographic examinations without taking proper precautions. The onset of the dermatitis is insidious, without pain or erythema to call attention to the recipient that certain skin changes are occurring which may ultimately affect his limb or even his life.

Chronic roentgen ray dermatitis also is classified into first, second and third degree. First degree chronic burns are characterized by dryness of the skin, longitudinal striations of brittle nails and loss of hair from the back of the fingers or hand (Fig. 3, left). These early changes should lead one to suspect the onset of chronic roentgen ray dermatitis and guide one into proper channels of treat-

6. Robinson, D. W. Surgical repair of irradiation defects. J. Kansas M. Soc. 49:456 Nov. 1948.

ment and precaution. Cutaneous atrophy, pigmentation, diminished activity of the sweat and sebaceous glands and ultimate sclerosis further characterize the first degree changes.

Chronic roentgen ray dermatitis of the second degree has all the features of the first degree but with the added presence of keratotic lesions and small ulcerations (Fig. 3, right). When large ulcerations (Fig. 4, above) or malignant degenerations (Fig. 4, below) occur, the dermatitis then is classified as one of the third degree. It is important to recognize that once chronic roentgen ray dermatitis is established, it tends to get slowly worse. Keratotic lesions may develop slowly and the dermatitis will change into one of second degree. Any chronic burn is always the source of subsequent necrosis or malignant degeneration. Malignant degeneration may develop in six months in a chronic burn or may delay its onset for as long as 20 years. Likewise there is always a latent period in the development of chronic dermatitis caused by roentgen rays or radium. Saunders and Montgomery,[7] in reviewing 259 cases, found a latent period of 4.8 years in first degree chronic burns, 4.2 years in second degree burns and 1.8 years in third degree burns.

The best treatment for chronic roentgen ray dermatitis is preventive in character. No matter what the calibration of his machine may be, a physician or dentist is wise who never exposes himself or his hands to roentgen rays.

A technic for taking dental roentgenograms wherein the technician is almost completely eliminated from the hazard of any exposure has been developed at the Mayo Clinic. The patient holds the film in his own mouth while the operator steps behind a leaded partition to make the exposure. The patient cannot possibly suffer from the minimal dose received, but the operator could suffer from accumulated doses if he exposed

7. Saunders, T. S., and Montgomery, Hamilton. Chronic roentgen and radium dermatitis: an analysis of 259 cases. J.A.M.A. 110:23 Jan. 1, 1938.

Fig. 3 • Chronic roentgen ray dermatitis. Left: First degree. Right: Second degree

Fig. 4 • Chronic roentgen ray dermatitis, third degree. Above left: With ulceration. Above right: Postoperative repair, with split-skin graft. Below: With malignant degeneration

himself to them. A further precaution taken at the clinic is the compulsory annual examination of the hands of all personnel whose daily work entails any possible exposure to radiation damage.

Once chronic roentgen ray dermatitis has become established, it is imperative that further exposure to roentgen rays be avoided. The hands should be examined every six months by a competent dermatologist. Complete removal of keratotic areas by fulguration usually will prevent carcinomatous degeneration. Trauma or infection may produce ulceration in a hyperkeratotic area, and when this occurs, wide excision to healthy skin and the placing of a skin graft may easily effect a cure. When there is even the slightest suspicion that malignant degeneration may be present, a biopsy should be performed. The degree of malignancy and the location of the lesion will determine whether excision and a skin graft or amputation is the treatment of choice. To temporize and try to save a digit when amputation could be performed might result in metastasis and death.

Radon ointment[8,9] and thorium X[10] have been advocated in some instances for the treatment of chronic dermatitis caused by roentgen rays and other radiation. Presumably the healing qualities are due to the alpha particles rather than to the beta or gamma rays that originally produced the radiation damage. There is still, however, the theoretical possibility of doing further damage with this treatment. Some of those who have reported good results feel that excision and skin grafting constitute the best treatment and that the use of radon ointment and thorium X should be reserved for those instances in which surgical measures are not feasible.

Prognosis • If chronic roentgen ray dermatitis develops, what is the prognosis as to malignant degeneration? The danger of such degeneration is always present, but as stated before, it may take as long as 20 years to develop. Saunders and Montgomery reviewed cases of roentgen ray and radium dermatitis at Mayo

8. Uhlmann, Erich. Treatment of injuries produced by roentgen rays and radioactive substances. Am. J. Roentgenol. 41:80 Jan. 1939.

9. Fricke, R. E., and Williams, M. M. D. Radon ointment for irradiation injuries: report of case. Proc. Staff Meet., Mayo Clin. 19:283 May 31, 1944.

10. Sher, J. J., and Howes, W. E. Thorium X treatment of skin epithelioma, keratoses, and delayed radiation changes. Radiology 56:39 Jan. 1951.

Clinic in 1938 and found that malignant degeneration occurred in 10 per cent. If first degree burns were eliminated, the incidence of malignancy was 19 per cent. Ghormley[11] then reviewed some cases in 1941 and found that the incidence of malignant degeneration was 20.6 per cent. In the present review of only the physicians and dentists with chronic roentgen ray dermatitis, the incidence of malignancy is 31 per cent. This gradual rise in the incidence of malignant degeneration may in part be explained by the fact that some of the patients seen several years ago without malignant change have in recent years developed definite epitheliomas. It is our belief that if all patients for whom biopsy was recommended had accepted it, the incidence of malignancy would have been found to be higher than 31 per cent.

It thus would seem reasonable to expect that a third of all patients with chronic roentgen ray dermatitis will develop malignant degeneration. When metastasis to regional lymph nodes occurs, the prognosis is grave.

CONCLUSIONS

1. Radiation always produces an injurious rather than a stimulating effect on the tissues.

2. Acute or chronic roentgen ray dermatitis of three degrees of severity may result from overexposure to roentgen rays.

3. Chronic roentgen ray dermatitis is most frequently observed on the hands of physicians and dentists who expose their hands to roentgen rays without adequate protection.

4. Reasonable protection will guard the physician or dentist against the development of roentgen ray dermatitis, but once it has developed there is a 31 per cent possibility of malignant degeneration.

5. The best treatment for roentgen ray dermatitis is the prevention of its development.

11. Ghormley, R. K. Surgical treatment of roentgen and radium dermatitis. Proc. Staff Meet., Mayo Clin. 16:69 Jan. 29, 1941.

Need for precaution in dental roentgenography

Lewis B. Spear, D.D.S., Indianapolis

About three months after the announcement of the discovery of roentgen rays by Wilhelm Konrad von Röntgen in 1895, an American general practitioner of dentistry produced an intraoral roentgenogram. This dentist, C. Edmund Kells of New Orleans, constructed his own apparatus originally and maintained great interest in roentgenology until his death in 1928. Like many of the pioneers in the field of roentgenology, he became a martyr to the cause of roentgenology and died of the deleterious effects of roentgen ray radiation before its adverse effects were known and methods of protection from it were developed.

Presented as part of a panel discussion "Hazards of Roentgenology in Dentistry" before the Sections on Roentgenology and Research, ninety-fifth annual session, American Dental Association, Miami, Fla., November 10, 1954.

Professor of radiology, Indiana University School of Dentistry.

The medical profession quickly realized the great possibilities of roentgenography as a diagnostic aid, and laboratories were established throughout the country. The progressive dentist at this time used the services of these laboratories.

A few years later some x-ray units designed exclusively for the use of the dentist were placed on the market. These machines were erratic in the production of roentgen rays because of the use of the gas roentgen ray tube and were electrically unsafe because of the exposed high voltage wiring. They were sold to dentists with inadequate instruction concerning the operation of the units and the proper procedure to produce satisfactory roentgenograms. At this time the oral roentgenogram was still more of a novelty than an accepted necessity in the practice of dentistry.

In 1909 Howard R. Raper, who felt that oral roentgenology should be recognized in the dental curriculum, established a course at the Indiana Dental College.[1]

About 1913 the Coolidge roentgen ray tube made its appearance. This tube was more stable than the gas tube and made possible roentgen ray output controlled in both quantity and penetration. In 1923 shockproof dental x-ray units were placed on the market. It thus was made possible for dental students to handle the x-ray machine and to familiarize themselves with the proper technic for producing reasonably satisfactory intraoral roentgenograms. With the increased safety in the operation of dental x-ray units, general practitioners began to acquire them and to realize the importance of roentgenography to all phases of dentistry. Today there is not a single branch of dentistry that does not rely heavily on the aid of roentgenography in making a diagnosis.

In general practice roentgenograms are used primarily for a general survey of the mouth. This survey includes periapical and bitewing views as well as auxiliary or specialized views. This general survey should disclose the following:

1. Presence and extent of proximal caries.
2. Extent of deep occlusal caries.
3. Location of supragingival and subgingival calculus.
4. Evidence of presence or extent of periodontal disease.
5. Condition of cervical margins of restorations.
6. Size of pulp chambers.
7. Evidence of periapical disease.
8. Fractured tooth roots.
9. Retained roots and evidence of residual infection.
10. Unerupted and supernumerary teeth.
11. Presence of foreign bodies.
12. Anomalies.
13. Abnormal alveolar trabeculation which might indicate neoplasms or evidence of systemic disease.
14. Resorptive processes of tooth structures.
15. Shape of tooth roots and hypercementosis.
16. Areas of hypercalcification.
17. In children, positions of unerupted teeth, extent of calcification of the roots and relation of the permanent teeth to the deciduous teeth.

Subsequent periodic examinations must be made to observe postoperative progress, recurring caries, progress of tardily erupting teeth, calculus and so forth. The frequency of these examinations depends on the needs of the patient.

In addition to the routine roentgenographic examination, the orthodontist will require cephalometric views of the

1. Raper, Howard R. Notes on the early history of radiodontia. Oral Surg., Oral Med. & Oral Path. 6:70 Jan. 1953.

head and possibly cross fire views for locating unerupted and supernumerary teeth.

The oral surgeon needs extraoral views of the mandible and maxilla in instances of trauma or extensive invasion of pathologic processes as well as cross fire views in order to locate irregularities.

The prosthodontist should have roentgenograms of the alveolar ridges just before constructing restorations and may require views of the temporomandibular joints.

A survey of 20 general practitioners of dentistry in Indianapolis with a representative cross section of clientele was made. It was found that each dentist made roentgenograms of an average of 462 patients in 1953. The dentist or his assistant made an average of slightly over six exposures per patient. The greatest number of exposures per patient was 13½ and the least was 2¼. The average for all exposures by all dentists surveyed was 2,772. Of course, the maximum exposure for an individual cannot be determined from an average, but the value for average indicates to some extent how much oral roentgenography is being done. About one half of the operators surveyed were using approximately 15 inches focal-skin distance, and the others were using approximately 7 inches focal-skin distance.

Many patients also will need general diagnostic roentgenograms of the chest, gastrointestinal tract, brain, bones and so forth, and at some time may need roentgen ray or some form of radiation therapy. All of this means that the dental patient receives considerable roentgen ray radiation during his lifetime. The x-ray technician as well as other office personnel may be receiving secondary radiation and occasionally some primary radiation.

The ever increasing concern of roentgenologists today is the danger of the effects of roentgen ray radiation on the patient and the operator, and much research is being done on this subject. Of especial concern to those in the educational field are those dentists who, because of the comparative newness of dental roentgenography, have received no formal training in the use of a dental x-ray unit, but have more or less taught themselves. It is felt that the problem of excessive radiation cannot be overemphasized.

The generally accepted theory today is that the effects of all the radiation that one receives are not reversible or eliminated, that is, that certain permanent changes take place in the individual after exposures to radiation. Since mutations may be hastened in succeeding generations, serious consideration must be given to all methods and devices which will reduce the amount of radiation that the patient, operator and office personnel receive.

The amount of radiation received by the patient from the dental x-ray machine depends on the focal-skin distance, the area of exposure, the speed of the film emulsion, the filter, the total exposure time, the milliamperage and the kilovolt peak of the roentgen ray tube circuit. The 7 inch and the 15 inch focal-skin distances are most commonly used today.

The radiation dosage delivered by the x-ray machine is expressed in roentgens (r), a roentgen being that quantity of x or gamma radiation producing in 1 cc. of air, at standard temperatures and pressure, ions carrying 1 electrostatic unit of charge of either sign.[2]

The National Committee of Radiation Safety has set the permissible dose of an operator at 300 milliroentgens (0.3 r) per week. This refers to whole body radiation and specifically excepts possible genetic changes.[3]

2. Selman, Joseph. Fundamentals of x-ray and radium physics. Springfield, Ill., Blackwell Scientific Publications, Charles C Thomas, 1954, p. 149.

3. Medical x-ray protection up to two million volts. National Bureau of Standards Handbook 41. Washington, D. C., Government Printing Office, 1949.

Table 1 • Calibration of x-ray units at 7 inch focal-skin distance with and without 1 mm. aluminum filter

Machine	1 mm. Aluminum filter	Milli-amperage	Kv. peak	r per minute
A	No	10	65	155
	Yes	10	65	54
B	No	10	65	198
	Yes	10	65	73
C	No	10	65	157
	Yes	10	65	88
D	No	10	63	91
	Yes	10	63	48

RADIATION STUDIES

Four different makes of x-ray machines in the radiodontics department at Indiana University were calibrated by the radiation physicist utilizing a Victoreen Condenser r meter and a Victoreen Roentgen Rate Meter.

One mm. aluminum filters are regularly used in the machines to cut out soft or less penetrating radiation and thus allow for the passage of the hard or deeper penetrating rays. Each x-ray machine was calibrated using both the 7 inch focal-skin distance and the 15 inch focal-skin distance with and without the 1 mm. aluminum filters (Tables 1 and 2). The meter readings for the 7 inch focal-skin distance were 10 milliamperes and 65 kilovolt peak, and at the 15 inch focal-skin distance the readings were 15 milliamperes and 67 to 70 kilovolt peak.

The primary radiation received by a patient during a full intraoral roentgenographic examination consisting of 14 periapical views, two bitewing views and three auxiliary views or "make-overs" was calculated also, using the data obtained from the calibration of the x-ray machine. The data presented here are averages of the four dental units.

When a 7 inch focal-skin distance, 10 milliamperes at 65 kilovolt peak, no filter and medium speed film were used, the patient received an average direct radiation per exposure of 8.72 r and an average total radiation per full mouth of 147.2 r. When a 1 mm. aluminum filter was used, other conditions remaining the same, the average direct radiation per exposure was 3.38 r, and the average total radiation was 64.4 r.

When a 15 inch focal-skin distance, 15 milliamperes at 65 kilovolt peak, a fast film and no filter were used, the patient received an average direct radiation per exposure of 2.18 r, and the average total radiation was 41.1 r. When a 1 mm. aluminum filter was used, the kilovolt peak had to be increased to 70, and the average direct radiation per exposure was 1.23 r, and the average total direct radiation received by the patient was 23.4 r.

These data show what a wide variation can exist in the output of the dental x-ray machine depending on the technic, type of filter and the film speed used.

Secondary radiation was studied on four anatomical locations on patients during intraoral roentgenographic examinations. Victoreen ionization chambers were placed on the chest, shoulder, knee and ankle of the patient. The total number of exposures for all patients was 391, and the average number of exposures per patient was 15. The average exposure to radiation measured in milliroentgens for the average patient is shown in Table

Table 2 • Calibration of x-ray units at 15 inch focal-skin distance with and without 1 mm. aluminum filter

Machine	1 mm. Aluminum filter	Milli-amperage	Kv. peak	r per minute
A	No	14½	65	40
	Yes	14½	70	22
B	No	15	67	47
	Yes	15	70	25
C	No	15	60	45
	Yes	15	65	25
D	No	10	63	36
	Yes	10	63	18

3. It must be remembered that there is also some secondary radiation in the area of primary radiation.

Secondary radiation was also studied using 91 Indiana University dental students during their regular assignments in the radiodontics department. The student stands 36 inches from the patient and is protected from primary radiation from nearby x-ray machines by means of lead shields. The x-ray machines used in the department utilize a 15 inch focal-skin distance and a 1 mm. filter, and they operate at 15 milliamperes at a 65 to 70 kilovolt peak.

The secondary radiation was measured using the Victoreen Minometer to charge and read the Victoreen ionization chambers. The chamber was in the form of a capsule or pencil and was worn in the breast pocket of the operator during his assignment in the radiodontics department. The chamber was charged, given to the student at the beginning of his assignment and read at the end of his assignment. The results are shown in Table 4.

Table 3 • Secondary radiation in mr.* received per patient during intraoral roentgenographic examination

Location	15 exposures	1 exposure
Chest	65.8	4.4
Shoulder	45.9	3.1
Knee	3.0	.2
Ankle	7.9	.5

*Milliroentgens.

Under similar conditions secondary radiation was studied in connection with the work of three full-time members of the radiodontics department (one faculty member and two technicians). The study was carried on for two full 40 hour weeks. The ionization chambers were charged and read at the beginning and end of each 40 hour week. The results from both weeks were averaged together to obtain data for an average 40 hour week. The results are shown in Table 5.

Table 4 • Secondary radiation received by average student operating unit at 15 inch focal-skin distance with 1 mm. filter

Average number of exposures per student	36.1
Average time of single exposure	5 sec.
Average exposure time of student during assignment	210.5 sec.
Average reading per student for 210.5 sec.	23.3 mr.
Average amount of radiation per exposure	.64 mr.

The fact that the amount of radiation per exposure for the personnel is much less than that for the students can probably be explained by the fact that the personnel have much more experience, are more careful and are more conscious of the dangers of roentgen ray radiation.

CONCLUSIONS

Several items demand attention if the primary and the secondary radiation received by the patient and all x-ray personnel is to be reduced:

1. The extended focal-skin distance should be adopted. The amount of radiation to the patient and to the operator thus will be reduced and, in addition, better definition of the roentgenograms will be obtained.

Table 5 • Secondary radiation received by personnel operating unit at 15 inch focal-skin distance with 1 mm. filter

Average total time of personnel exposure during 40 hr. week	1632.2 sec.
Average exposure time per film	5 sec.
Average number of exposures per 40 hr.	322.4
Average reading for 1632.2 sec.	118 mr.
Average amount of radiation per exposure	.37 mr.

2. Dental x-ray machines should have the correct filtration.

3. The x-ray machine head should be checked for radiation leaks.

4. The personnel must be well trained concerning the potential dangers of roentgen ray radiation to themselves and to the patient. They must also be trained to use careful technic to reduce the number of original exposures and "make-overs" per patient.

5. Fast films should be used.

6. Some type of protection should be provided for the patient.

Protection in the use of dental roentgenographic equipment

Scott W. Smith, Ph.D., Washington, D. C.

Roentgenography has become an essential part of dental practice. Unfortunately, its widespread use has not been accompanied by a corresponding understanding of the associated hazards. Under proper circumstances it can be employed with relative safety for both the patient and dental personnel; thus, it is important that such safe conditions and procedures be established and maintained.

PERMISSIBLE EXPOSURE

Basic to the consideration of roentgenographic safety requirements is the dose which can be accepted as a permissible exposure. Exposure to ionizing radiation cannot be avoided completely, as the earth and all its inhabitants are continually bathed in a field of low-intensity cosmic rays and the gamma rays from radioactive materials near the surface of the earth. This unavoidable radiation subjects each individual to a dose of 0.1 milliroentgen per day, or about 1/400 of the presently accepted permissible exposure. Apparently, this small amount of radiation can be tolerated by human beings, but the question is, "How much more can be received by the individual without appreciably affecting his well-being?"

Many attempts have been made to determine a safe limit for whole-body irradiation by indirect means. Unfortunately, radiation levels as determined in animal experiments cannot be translated directly into the radiation levels at which different types of damage occur in human beings because of the variation in radiation sensitivity of different species. On the other hand, a number of the effects in human beings are fairly well known from experience gained in the medical use of roentgen rays and radium. Some

Presented before the Section on Roentgenology and Research, ninety-fifth annual session, American Dental Association, Miami, Fla., November 10, 1954.

Chief, radiological equipment section, radiation physics laboratory, National Bureau of Standards.

information is also available for workers whose level of exposure over a period of many years is known with some certainty. To this may be added the knowledge gained from the unfortunate results of overexposure of many early workers with roentgen rays, and from other more recent studies of radiation damage.

Although the damaging effects of ionizing radiations have been known since shortly after the discovery of roentgen rays and radium, no definite actions leading toward establishment of a maximum permissible level of exposure were undertaken until about 1929. Since then, the problem has been studied by many groups throughout the world, and particularly in this country by what is now named the National Committee on Radiation Protection.[1] In accord with increasing knowledge of the subject, and because of the more widespread use of higher energy radiations, the so-called "tolerance dose," now usually called the "maximum permissible dose," established in 1934 as 0.2 r per day, and later reduced to 0.1 r per day, was again changed several years ago to 0.3 r per week measured in air. The term "tolerance dose" was, in fact, considered to be misleading and was therefore changed to "maximum permissible dose."

The "maximum permissible dose" is based on the welfare of the individual who is occupationally exposed to the radiation and does not specifically take into consideration possible genetic effects such as may occur when large population groups are exposed. There is considerable discussion of this problem at the present time. The maximum permissible dose is defined as the dose of ionizing radiation that, in the light of present knowledge, is not expected to cause detectable bodily injury to a person at any time during his lifetime. The amount of radiation to which the patient is exposed is the responsibility of the dentist, and it should be kept to the minimum consistent with diagnostic requirements. Permissible exposure is discussed in detail in National Bureau of Standards Handbook 59, *Permissible Dose from External Sources.*[2]

POTENTIAL EXPOSURE

There are three potential sources of roentgen ray exposures for the dentist and his technician; namely, (1) the useful beam passing through the tube port, (2) leakage radiation passing through the tube protective housing and (3) scattered radiation from the patient and other objects.

Useful Beam • The useful beam, although partially attenuated in passing through the patient, is still of relatively high dose rate. Also, in some exposures, the edge of the beam may pass through a relatively small amount of tissue or miss the patient completely. Exposure to the useful beam can be avoided by standing to one side or back of the tube, or behind a protective screen. Consideration should also be given to the protection of persons who regularly occupy regions in adjacent rooms and who may be in the path of the beam. It should be verified that the size of the useful beam has been limited by means of a lead diaphragm or cone to as small an area on the patient as is normally required. The use of a small field not only reduces the exposure to the patient, but produces less non-image-forming scattered radiation; thus, the diagnostic quality of the roentgenogram is actually improved, and the stray scattered radiation reaching personnel in the area is reduced.

Scattered Radiation • The graph in Figure 1 shows that the scattered radiation in a direction at right angles to the

1. National Bureau of Standards Handbook 41. Medical x-ray protection up to two million volts. Washington, D. C., Government Printing Office.

2. National Bureau of Standards Handbook 59. Permissible dose from external sources of ionizing radiation. Washington, D. C., Government Printing Office.

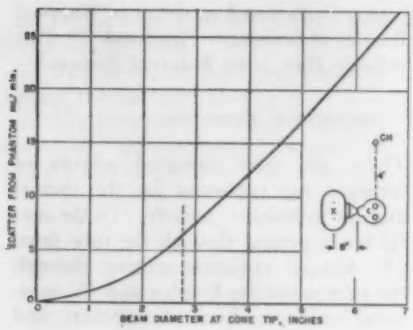


Fig. 1 • Relationship between diameter of field and amount of scattered radiation for an eight inch target to film distance and a four foot ionization chamber distance. Dotted line is for smallest beam that will cover a dental film

useful beam increases approximately in proportion to the size of the field. Fortunately for dental roentgenography, the beam can be relatively small. The use of a pointed plastic cone permits accurate alignment of the beam with the part being examined, but the plastic cone itself does not usually limit the beam. A lead diaphragm placed inside the cone at the tube port has an opening of the right size to provide the required field. This lead diaphragm should reduce the intensity of the absorbed part of the beam to the same extent as the rest of the housing and should be about 0.8 mm. lead for units operating up to 70 kilovolt peak.

Most dental x-ray units in use today have a protective enclosure which contains the high-voltage transformer and x-ray tube, with either oil or air used to insulate the high-voltage parts from the grounded enclosure. The roentgen rays emerge through a port in the enclosure such that the glass, oil, Bakelite, and other materials in the path of the rays are equivalent in their filtering action to only about 0.5 mm. of aluminum. This small amount of inherent filter lets through an appreciable quantity of soft roentgen rays which are in turn almost completely absorbed by the tissues under examination and hence do not reach the film. Thus, these rays do not contribute to the formation of the image, but simply add to the patient's exposure and to the stray scattered radiation which in turn fogs the film. To reduce the amount of unusable soft radiation emerging from the tube at least 1.5 mm. of aluminum which includes the inherent and the added filter should be in the path of the roentgen ray beam.

The "half-value-layer" is a convenient index for indicating the penetrating quality of the radiation. It is the amount of material which, when placed in the roentgen ray beam, cuts its dose rate in half. As can be seen in Figure 2, the first millimeter or two of filter changes the quality of the radiation rapidly, as indicated by the increase in half-value-layer. This effect is due to attenuation of the softer components of the beam which do not serve a useful purpose. It is therefore desirable to add about 1 mm. of aluminum filter (making a total of 1.5 mm.) at the tube port to remove this unwanted soft radiation, which accounts for

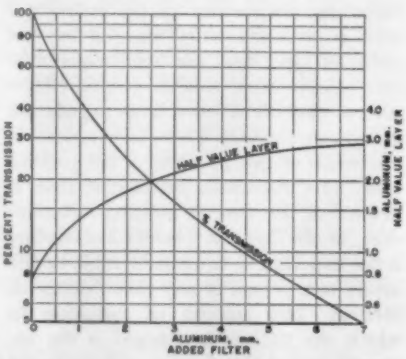


Fig. 2 • Effect of filter on roentgen ray beam quality

about one half of the unfiltered beam intensity.

Leakage Radiation • The protective housing which encloses the x-ray tube contains a lead shield to attenuate the radiation in all directions except that of the useful beam. Most diagnostic x-ray tube units and dental tube heads meet the present recommendations[1] which call for sufficient protective material to reduce the leakage radiation to no more than 0.1 r per hour at one meter from the tube target when the tube is operated at the maximum voltage and milliamperage for continuous operation. Thermal characteristics of diagnostic tubes limit their continuous operation to from 3 to 5 milliamperes. Since actual dental exposures are made at 10 to 15 milliamperes, the leakage radiation during such exposures is, of course, correspondingly higher.

The leakage radiation in various directions from the target of a dental shockproof x-ray tube unit, as measured at a distance of one meter, is shown in Figure 3. The values given are for 10 milliamperes, and hence the leakage radiation shown is about twice the value as that for leakage radiation with continuous operation. Except for the end of the tube, where apparently insufficient lead has been installed, the leakage radiation is seen to be well within the specified limit. Another type of defect which may exist is caused by small gaps in the lead shield which permit narrow but intense roentgen ray beams to leak through. The presence of these small beams can be shown by placing films around the enclosure or by means of a fluorescent screen.

Although the dentist can avoid exposure to the useful beam by standing to the side or back of the x-ray tube during operation, he is still exposed to the leakage radiation through the tube housing and to the radiation scattered from the patient. Under the conditions of dental roentgenography, the scattered radiation

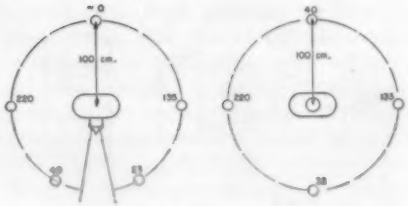


Fig. 3 • Leakage radiation through x-ray tube housing

may be several times as great as the leakage radiation. With the tube operating at 65 kilovolt peak and 10 milliamperes, the sum of the two radiations is of the order of 0.5 to 1.0 r per hour at a distance of three feet from tube and patient. At this rate of exposure, the weekly permissible dose of 0.3 would be attained at a three-foot distance with about 200 milliampere-minutes of operation, or 400 exposures of 3 seconds each at 10 milliamperes. If it is assumed that 16 films per patient are used, it would be possible to examine 25 patients before exceeding 0.3 r at the three-foot distance.

Although the actual values of the leakage and scattered radiation will differ from the values given herein for various installations, the difference for similar operation will in general not be very great. For operation above 200 milliampere-minutes per week or at higher voltages, the dentist must either be farther from the tube and patient or stand behind a protective screen which shields him from the radiation.

METHODS OF PROTECTION

Protection from stray radiation may be attained by placing absorbing barriers in the path of the radiation that will reduce the dose rate to a permissible value, or it can be achieved by the use of distance, since the dose rate falls off with the inverse square of the distance.

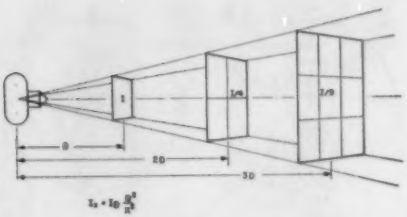


Fig. 4 • Reduction in dose rate with inverse square of distance. Intensity at twice the distance D (marked 2D) is one fourth the intensity (¼) as that at D; and one ninth (1/9) at distance 3D

Distance Protection • As can be seen from the diagram of Figure 4, the roentgen rays coming from the tube target spread out and cover larger areas as the distance is increased. As the area over which the radiation is spread increases with the square of the distance, the dose rate of the radiation falls off with the inverse square of the distance. Where the required reduction in dose rate is not too great, it may be possible to use distance alone for protection; otherwise, a combination of distance and protective barrier must be used. For the purpose of economy in protection, persons in adjacent rooms should be located as far from the x-ray unit as possible. A distance of 35 feet furnishes the required protection from the useful beam for operation at about 70 kilovolt peak with a maximum workload of 200 milliampere-minutes per week. The barrier requirements for any given distance and set of operating conditions can be determined by computation or by consulting tables and graphs in handbooks and guides.[1, 2]

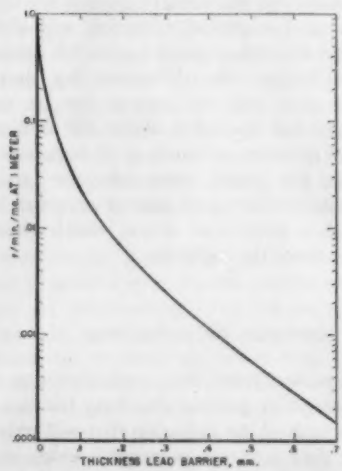


Fig. 5 • Attenuation curve for lead with 65 kilovolt peak roentgen rays

Barrier Protection • The thickness requirement for a protective barrier depends on a number of factors that include the quality of the radiation to be attenuated, the dose-rate reduction required, and the effectiveness of the barrier material in attenuating the radiation. The basic data for calculating the barriers are attenuation measurements for various qualities of radiation and barrier thicknesses. These data may be charted in the form shown in Figure 5.

The dose rate at a distance of one meter from the x-ray tube in roentgens per minute per milliampere of current is plotted against various thicknesses of sheet lead for roentgen rays produced at a given kilovoltage. The ordinate of the graph is on a logarithmic scale so as to permit the inclusion of a wide range of dose rate reduction. The dose rate for one milliampere may be multiplied by the actual milliamperage to obtain the value of the dose rate for that tube current. In dental roentgenography, the equipment is not operated continuously but is used to make discrete exposures. These may consist of operation at 65

3. National Bureau of Standards Handbook 50. X-ray protection design. Washington, D. C., Government Printing Office.

kilovoltpeak and 10 milliampere, for a series of several 3-second exposures. The actual number of these exposures per day or per week will vary from time to time according to requirements. They may be averaged, however, to obtain an average dose rate in terms of the length of time the region is to be occupied. Such an average dose rate can then be referred to the attenuation curve to obtain the required barrier thickness that will reduce the dose rate to the permissible level. For example, suppose the workload for a unit operating at 65 kilovolt peak has an average workload of 200 milliampere-minutes per week. It is necessary to determine the barrier needed at a distance of five feet from the tube in order to reduce the useful beam to the permissible dose rate of 0.3 r per week. A dose rate of 0.3 r per week at five feet is increased to $(5)^2/(3.28)^2 \times 0.3$ or 0.7 r per week at one meter (3.28 ft.). Reference to Figure 5 indicates that for the unfiltered beam, 1 milliampere-minute corresponds to 1.0 r at one meter. Thus, 200 milliampere-minutes per week would be 200 r per week at one meter. This dose rate must be reduced to 0.7 r per week, or a reduction of 0.7/200 or 0.0035. A reduction of this amount is obtained by 0.23 mm. of lead, as shown in Figure 5.

Primary protective barriers are those used to attenuate the useful beam to the permissible dose rate, and secondary protective barriers are those used to attenuate stray radiation to the permissible level. A consideration of the various directions in which the useful beam may be pointed in dental roentgenography indicates that the floor, ceiling and walls to the sides and to the back of the dental chair should be considered as primary barriers. Since the useful beam will not be pointed toward the wall in front of the chair, this wall may be considered a secondary barrier.

In addition to the kilovoltage at which the x-ray tube is operated and the distance to the barrier, there are several other factors which influence the barrier requirement. The "workload" expressed in milliampere-minutes per week will differ from one office to another. It will depend on the average number of roentgenograms made over a period of time and can be conveniently expressed in terms of milliampere-minutes per week, since all of the exposures are similar. A small general dental office might be considered as one having a workload of about 200 milliampere-minutes per week, which has already been shown to be safe at three feet for stray radiation. A busy dental office might have a workload of 800 to 1,000 milliampere-minutes in each week.

Obviously, the useful beam can only be pointed in one direction at a time, but certain directions may be preferred because of the type of work done. The "use factor" is the fraction of the workload during which the useful beam is pointed in the direction under consideration. A use factor of 1 means that the useful beam may be pointed toward the barrier during the entire time, and assigning a use factor of 1 is on the safe side.

A barrier is provided to protect the persons who occupy the region beyond the barrier. This occupancy may be only occasional, or it may be during all of the time that the x-ray machine is in use. The fraction by which the workload should be multiplied to correct for the degree or type of occupancy of the area is termed the "occupancy factor." The workload which applies to any particular barrier, therefore, is the product of three factors—workload, use factor and occupancy factor.

SAFE OPERATION OF THE EQUIPMENT

Protective barriers, when necessary, should be employed to protect persons in areas adjacent to the dental roentgenographic room. The safety of the dentist or his technician depends largely on proper procedures in use of the equipment.

Attention is called to several points which should be observed for the sake of safety.

1. The film should be held by the patient when a roentgenogram is taken, or, if this is impossible, by some other person not habitually exposed to roentgen rays. It should never be held by the dentist or his assistant.
2. For routine operation, only the patient should be in the useful beam. All persons, as well as the dentist and his assistants, must stand clear of the useful beam.
3. The tube housing shall not be held in the hand during exposure.
4. The position of the operator or his assistant must not be within the region where the stray radiation is expected to exceed the permissible value.
5. Hand-held fluoroscopic screens represent a hazard and should never be used for any reason.
6. The roentgenographic field should not be larger than is clinically necessary.
7. The number of roentgenograms of a patient should be held to the minimum consistent with diagnostic requirements.
8. Repeated roentgenograms made of human beings in order to develop a technic or in order to practice should be avoided.

MONITORING

The determination of the dose rate in an occupied area, or the dose received by a person, necessitates the proper use of suitable radiation measurement devices. Such a survey, when required, should be carried out by a qualified individual[1] who has the necessary training and experience to conduct the survey properly, to estimate the degree of radiation hazard and to advise concerning such hazard. Where radiation monitoring of personnel is necessary or desired, it should be carried out under the direction of a qualified person or through a recognized suitable commercial monitoring service. Dental films may give very erroneous dose indications if improperly used.

BIBLIOGRAPHY

1. Scott, W. G., and others. Planning guide for radiologic installations. Chicago, The Year Book Publishers, 1953.
2. Richards, A. G. X-ray protection in dentistry. J. Oral Surg. 8:323 Oct. 1950.
3. English, J. A. Analysis of dangers of x-radiation. D. Radio. & Photog. 25:1, 1952.
4. Jacobson, L., and Sheppard, I. M. X-ray hazards and protection in dental radiography. New York D.J. 18:367 Oct. 1952.
5. Nolan, W. E. Radiation hazards to the patient from oral roentgenography. J.A.D.A. 47:681 Dec. 1953.
6. Budowsky, J., and Kutscher, A. H. Exposure to x-radiation during the general practice of dentistry. New York D.J. 19:298 June-July 1953.
7. Hazards of dental radiography. 16 mm. color sound film, available from National Bureau of Standards, Technical Reports Division, Washington, D. C.
8. Ritter, V. W.; Warren, S. R., and Pendergrass, E. P. Roentgen doses during diagnostic procedures. Radiology 59:238 Aug. 1952.
9. Radiation from dental x-ray machines. Technical Memorandum M-1441, April 15, 1952, Signal Corps, Ft. Monmouth, N. J.

Grandeur • Grandeur consists in form, and not in size; and to the eye of the philosopher, the curve drawn on a paper two inches long is just as magnificent, just as symbolic of divine mysteries and melodies, as when embodied in the span of some cathedral roof. *Charles Kingsley.*

New local anesthetic solutions containing propoxycaine

M. L. Tainter, M.D.; G. D. Wessinger,† Ph.D., D.D.S., Rensselaer, N. Y., and J. W. Lee,‡ L.D.S., R.C.S., D.D.S., New York*

During the past decade, the practicing dentist has become increasingly aware of the necessity for providing comfort and freedom from pain during both surgical and operative procedures. Failure to provide this freedom from painful sensations makes the patient tense and less cooperative, it increases the difficulties and the time required to carry out the necessary operations, and finally, it may even deter the patient from seeking his dentist for needed care, or from returning subsequently in order to have his work completed. Therefore, the availability of potent, reliable and safe local anesthetic agents is of paramount importance.

Through the past 20 years, there has been a definite trend toward the use of local anesthetic solutions of increasing potency. It may be argued, and rightly, that substantially all of the local anesthetic agents now in use will give adequate depth of anesthesia when properly injected in the immediate vicinity of the nerve to be blocked. Because of anatomic aberrations or the presence of infection, however, there are times when even the most competent operators are not successful in placing the solution accurately. Similar incomplete anesthesia may also result at times even under more normal conditions, if the injection is made by a somewhat less skillful operator. When this occurs and the solution is not deposited immediately in the nerve or its sheath, then anesthesia can be produced only by diffusion of the anesthetic agent from the site of injection to the nerve. As soon as an anesthetic solution is deposited in the tissues it begins to be diluted by the tissue fluids. The farther the solution must diffuse, the more the dilution. Accordingly, there may be occasions when the anesthetic agent at the nerve is diluted below the threshold anesthetic concentration, and when this occurs, incomplete and unsatisfactory anesthesia will result. The determination of the amount of dilution an anesthetic solution can undergo and still produce anesthesia is the basis of a new recent laboratory method for determining the potency of such drugs in animals.[1]

One of the first efforts to raise the potency of dental local anesthetic solutions was by the increasing of the concentration of procaine hydrochloride from 2 to 3 or even 4 per cent. This measure was not attended with complete

*Director, Sterling-Winthrop Research Institute, Rensselaer, N. Y.

†Assistant director, Sterling-Winthrop Research Institute.

‡Director of clinical research, Cook-Waite Laboratories, Inc., New York.

1. Luduena, F. P., and others. To be published.

success which was no great surprise to those familiar with the pharmacology of procaine. It has been known for many years that this compound, in addition to being a local anesthetic agent, is also a rather active vasodilator. Accordingly, when concentrations of procaine greater than 2 per cent are used, the vasodilator action of the anesthetic so relaxes the blood vessels that even high concentrations of epinephrine are unable to produce a maximal local vasoconstriction. Consequently, the procaine is carried away by the circulation prematurely, so that the intensity of anesthesia is not as great as needed, and the duration is shortened to the point where it is no longer adequate for some cases.

In addition, lack of proper vasoconstriction increases the incidence of excessive bleeding. All of these effects have been demonstrated in well controlled clinical studies.[2,3] It should be pointed out, however, that concentrations of procaine higher than 2 per cent do increase the incidence of satisfactory anesthesia, and thereby reduce the need for reinjection by about one half.[2] Higher strengths than 4 per cent are too irritating to be acceptable in dental practice.

Another approach to the problem of preparing anesthetic solutions of increased potency would be to use compounds that are considerably higher in activity than procaine, but this is apt to lead to anesthesia of too long duration or with undue toxicity or irritation. The third approach, which has proved most successful in our experience thus far, is to combine a low concentration of a more potent compound with the 2 per cent procaine. In this way, the known virtues of procaine—especially its freedom from systemic toxicity and local irritation—are preserved, and at the same time the potency is increased by the stronger compound without proportionate prolongation of action. This paper shows that, by appropriate choice, the potency, relative irritation and toxicity and duration of anesthesia can be improved to useful degrees. This approach to the problem contains possibilities of synergism as well as additions of action which make this type of combination attractive.

It seemed appropriate at this time, therefore, to examine critically in the clinic several of the more widely used fortified solutions to determine if they are accomplishing the objective for which they are intended; that is, increased reliability in producing a high grade of anesthesia in a high percentage of cases without at the same time subjecting the patient to an increased incidence of untoward side effects.

METHOD OF STUDY

In the developmental phases of the study, the concept laid down many years ago by one of us[4-8] was adhered to; that is, the concept that, in order for the results to be reliable and objective, the clinician must not at any time be aware of the composition of the solution being employed so that no subconscious bias can distort the interpretation of the response. It was not practical, however, to carry out this procedure on a large scale and accordingly it was not followed by the approximately 300 dentists who volunteered to participate in this clinical study.

2. Winter, Leo, and Tainter, M. L. Clinical evaluation of local anesthetic solutions of increased strength. Am. Orthodont. & Oral Surg. 31:307 May 1945.

3. Tainter, M. L.; Luduena, F. P., and Hoppe, J. O. Trend to more potent local anesthetic solutions in dentistry. Oral Surg., Oral Med. & Oral Path. 6:645 May 1953.

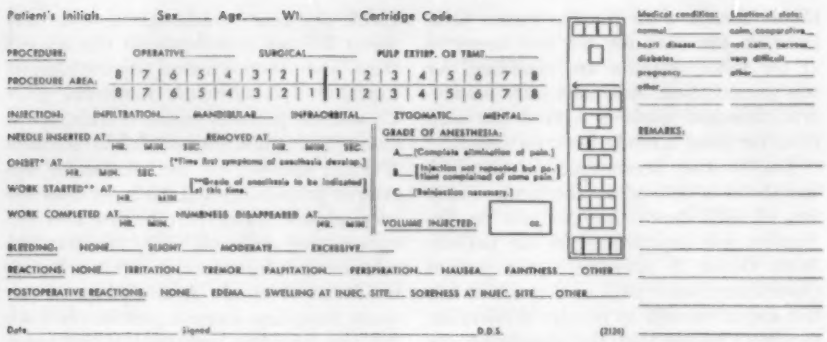
4. Tainter, M. L.; Throndson, A. H., and Moose, S. M. Comparison of procaine hydrochloride and procaine borate (borocaine) as local anesthetics. J.A.D.A. 24:376 March 1937.

5. Tainter, M. L.; Throndson, A. H., and Moose, S. M. Vasoconstrictors on the clinical effectiveness and toxicity of procaine anesthetic solutions. J.A.D.A. 25:1321 Aug. 1938.

6. Tainter, M. L.; Throndson, A. H., and Moose, S. M. Alleged clinical importance of buffered local anesthetic solutions. J.A.D.A. 26:920 June 1939.

7. Tainter, M. L., and Throndson, A. H. Value of potassium in local anesthetic solutions of procaine with epinephrine. J.A.D.A. 27:71 Jan. 1940.

8. Tainter, M. L., and Throndson, A. H. Monocaine as a local anesthetic. J.A.D.A. 28:1209 Aug. 1941.


Patient's Initials_____ Sex_____ Age_____ Wt._____ Cartridge Code_____

PROCEDURE: OPERATIVE_____ SURGICAL_____ PULP EXTIRP. OR TRMT._____

PROCEDURE AREA: 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8
8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

INJECTION: INFILTRATION___ MANDIBULAR___ INFRAORBITAL___ ZYGOMATIC___ MENTAL___

NEEDLE INSERTED AT_____ HR. MIN. SEC. REMOVED AT_____ HR. MIN. SEC.

ONSET* AT_____ HR. MIN. SEC. [*Time first symptoms of anesthesia develop.]

WORK STARTED** AT_____ HR. MIN. [**Grade of anesthesia to be indicated at this time.]

WORK COMPLETED AT_____ HR. MIN. NUMBNESS DISAPPEARED AT_____ HR. MIN.

BLEEDING: NONE___ SLIGHT___ MODERATE___ EXCESSIVE___

REACTIONS: NONE___ IRRITATION___ TREMOR___ PALPITATION___ PERSPIRATION___ NAUSEA___ FAINTNESS___ OTHER___

POSTOPERATIVE REACTIONS: NONE___ EDEMA___ SWELLING AT INJEC. SITE___ SORENESS AT INJEC. SITE___ OTHER___

GRADE OF ANESTHESIA:
A___[Complete elimination of pain.]
B___[Injection not repeated but patient complained of some pain.]
C___[Reinjection necessary.]

VOLUME INJECTED: ___ cc.

Medical condition: normal___ heart disease___ diabetes___ pregnancy___ other___

Location of data: calm, cooperative___ not calm, nervous___ very difficult___ other___

REMARKS:

Date_____ Signed_____ D.D.S. (2124)

Report card used for recording the observations in study of local anesthetics

Most of the injections were made by the practicing dentists in their private offices under the usual circumstances prevailing in each particular office. These dentists were located throughout the United States, so that the results obtained represent many different technics, which may vary from one section of the nation to the other. The present results, therefore, represent a good cross section of the average experience of the dental profession. The solutions were supplied in cartridges appropriately labeled, with most men receiving several solutions.[9] The records in each case were kept on a uniform report card supplied to them (illustration). The data reported on these record cards was then punched into IBM cards, for greater ease in sorting and tabulating by machine.

RESULTS

Over 13,000 case history cards were received on five different anesthetic solutions. The statistical analysis of the results is shown in Table 1 for the number of patients, volume of solution used, and grade of anesthesia. In Table 2 are summarized the time required for anesthesia to develop (onset time), duration of anesthesia, bleeding, and side effects.

Separate values are shown for surgical and operative procedures. This is because clinical experience has demonstrated that anesthesia for cavity preparation is more difficult to obtain than anesthesia satisfactory for extractions. Or, to put it another way, more profound anesthesia is required to block pain sensations produced by the bur than is needed for pain produced in the operations involved in exodontics. It will be noted that the sum of the operative and surgical cases is smaller than the total number of cases listed for each solution. The difference is due to a small group of cases involving pulp canal therapy. These latter cases were not included in either the operative or surgical groups, but were added to the totals.

No outstanding differences in volume of solution injected were observed other than that for all the solutions the volumes needed for patients requiring operative procedures were uniformly less than for those requiring surgical ones. Unfortunately, at the time of preparing this report, the number of instances in which procaine 2 per cent with epinephrine 1:50,000 or 1:60,000 was used is

9. The solutions used in these studies were supplied by Cook-Waite Laboratories, Inc.

much smaller than for the mixed solutions, so the data for the two strengths of the vasoconstrictor are combined for this presentation. Adequate data on several thousand patients with 2 per cent procaine have already been published.[4-8]

For the study herein reported, Grade A anesthesia is defined as anesthesia which was of such depth that no pain or discomfort was experienced by the patient. With Grade B anesthesia, the patient experienced some pain or discomfort but not severe enough to require reinjection. Grade C means that the anesthesia was sufficiently incomplete as to require a second injection.

It is seen that the propoxycaine hydrochloride, procaine hydrochloride and levarterenol (RNL) solution produced the highest over-all incidence of Grade A or completely satisfactory anesthesia (90.7 per cent), although it was only about 2.5 per cent better in this respect than the propoxycaine hydrochloride, procaine hydrochloride, nordefrin (RN C) and the procaine hydrochloride, tetracaine hydrochloride, nordefrin solution (NPL), and 4.7 per cent better for operative procedures and 10.9 per cent for surgical procedures than the procaine and epinephrine solution. All the fortified solutions produced a considerably higher incidence of Grade A anesthesia in patients requiring surgical procedures than did the procaine and epinephrine solution. The lower incidence of completely satisfactory anesthesia obtained with procaine 2 per cent with epinephrine in the instances where the surgical procedures were required is in line with our observations in animal studies.

The incidence of Grade A anesthesia

Table 1 • Summary of average results with local anesthetic solutions in 13,908 cases

Solution	Procedure	Number of patients	Volume injected Mean ± s.e.	Grade of anesthesia		
				%A	%B	%C
Procaine 2% Epinephrine 1:50,000 or 1:60,000 NE	Operative Surgical All	515 239 767	1.75 2.85 2.07 ± 0.04 n = 731	86.1 80.6 84.5 ±1.35	9.5 13.6 10.7 ±1.15 n = 721	4.4 5.8 4.9 ±0.80
Procaine 2% Tetracaine 0.15% Nordefrin 1:10,000 NPC	Operative Surgical All	818 584 1,493	1.75 2.92 2.25 ± 0.03 n = 1,451	81.2 85.8 83.1 ±1.00	13.8 8.7 11.8 ±0.86 n = 1,402	5.0 5.5 5.1 ±0.59
Procaine 2% Tetracaine 0.15% Levarterenol 1:30,000 NPL	Operative Surgical All	714 513 1,291	2.13 2.79 2.37 ± 0.04 n = 1,073	87.1 89.8 88.3 ±0.92	10.4 6.0 8.4 ±0.80 n = 1,216	2.5 4.2 3.4 ±0.52
Propoxycaine 0.4% Procaine 2% Nordefrin 1:10,000 RNC	Operative Surgical All	2,467 1,825 4,670	1.98 2.93 2.37 ± 0.02 n = 4,564	87.9 88.7 88.1 ±0.47	8.2 5.8 7.4 ±0.38 n = 4,668	3.9 5.5 4.5 ±0.30
Propoxycaine 0.4% Procaine 2% Levarterenol 1:30,000 RNL	Operative Surgical All	3,639 1,470 5,687	1.92 2.58 2.11 ± 0.01 n = 5,418	90.8 91.5 90.7 ±0.39	7.2 5.6 7.0 ±0.34 n = 5,604	2.0 2.9 2.4 ±0.20

for the 2 per cent procaine solutions is somewhat lower, however, than that which was observed by us in a previous similar study. The reason for this may be twofold: The dentists carrying out the present study probably applied somewhat more rigid criteria of satisfactory anesthesia than those in the previous study; also, the number of instances in the 2 per cent procaine group in this study is considerably smaller than for the other solutions. Consequently the averages may not be as reliable.

The necessity for reinjection (Grade C anesthesia) follows the reverse pattern, as might be anticipated. The propoxycaine hydrochloride, procaine and levarterenol solution required the fewest reinjections, followed by the procaine-tetracaine-levarterenol solution, the propoxycaine-procaine-nordefrin solution, the procaine-epinephrine solution, and the procaine-tetracaine-nordefrin solution, in the order named. The differences between some of these solutions in this regard were small and of little practical significance. With propoxycaine-procaine-levarterenol solution, less than one half as many reinjections were required as with the procaine-epinephrine solution

Table 2 • Summary of average results with local anesthetic solutions in 13,908 cases

Solution	Procedure	Onset time minutes	Duration minutes	Bleeding (Surgical only)			Systemic reactions	Post-operative reactions
		Mean ± s.e.	Mean ± s.e.	Slight %	Moderate %	Excessive %	% none ± s.e.	% none ± s.e.
Procaine 2% Epinephrine 1:50,000 or 1:60,000 NE	Operative	2.62	111.1				94.6	99.4
	Surgical	3.30	142.2	59.4 ±3.32	35.0 ±3.24	5.5 ±1.55	87.0	90.0
					n = 217			
	All	2.84 ± 0.07 n = 724	124.4 ± 4.11 n = 245				92.2 ± 0.97	96.5 ± 0.67
Procaine 2% Tetracaine 0.15% Nordefrin 1:10,000 NPC	Operative	2.72	184.5				92.8	99.4
	Surgical	3.13	198.2	55.2 ±2.18	38.9 ±2.13	5.9 ±1.03	92.8	96.1
					n = 522			
	All	2.96 ± 0.07 n = 1,443	189.9 ± 3.19 n = 869				92.5 ± 0.68	98.1 ± 0.35
Procaine 2% Tetracaine 0.15% Levarterenol 1:30,000 NPL	Operative	2.59	217.9				93.7	98.3
	Surgical	3.05	185.1	54.8 ±2.39	43.3 ±2.38	1.8 ±0.64	89.7	98.6
					n = 434			
	All	2.78 ± 0.08 n = 1,168	205.1 ± 4.56 n = 555				91.9 ± 0.76	98.5 ± 0.34
Propoxycaine 0.4% Procaine 2% Nordefrin 1:10,000 RNC	Operative	1.20	156.8				94.8	98.0
	Surgical	1.50	162.2	63.0 ±1.18	34.1 ±1.16	2.9 ±0.41	92.1	97.1
					n = 1,679			
	All	1.33 ± 0.03 n = 4,257	159.2 ± 1.23 n = 2,605				93.6 ± 0.36	97.7 ± 0.22
Propoxycaine 0.4% Procaine 2% Levarterenol 1:30,000 RNL	Operative	1.64	155.6				96.7	98.8
	Surgical	1.77	154.3	60.8 ±1.40	36.5 ±1.38	2.7 ±0.46	94.2	98.0
					n = 1,223			
	All	1.69 ± 0.03 n = 4,672	155.4 ± 0.98 n = 3,571				96.0 ± 0.26	98.7 ± 0.15

and the procaine-tetracaine-nordefrin solution.

Onset Time • Another important property of local anesthetic solutions is the onset time, which is the time required for symptoms of anesthesia to develop, measured from the time that the injection is completed. It may be noted that the case record card specified the time that work began as well as the time of onset of anesthesia. The time that the work began was not included in the tables since no significance as to the potency of the solutions can be attached to it. It was included on the cards because previous experience had indicated that if it were omitted some dentists would record the time at which work began in the space provided for onset time. A rapid onset not only reduces the time which the dentist must wait after the injection, but, perhaps of more importance, when anesthesia develops almost instantaneously, it gives the patient a much greater feeling of confidence and security.

The solution that had the most rapid onset was the propoxycaine-procaine-nordefrin solution with which anesthesia was present in 80 seconds. The onset time for patients requiring operative procedures was uniformly shorter with all solutions than it was in those requiring surgery. The reasons for this are not obvious, but it may indicate that some dentists apply a more severe criterion to anesthesia for surgical than for operative work.

Duration • The duration of anesthesia for purposes of this study was defined as the time which elapsed between the development of anesthesia and the time when the last traces of numbness had disappeared. It is obvious, therefore, that this is much longer than the duration of working anesthesia. From some points of view, the duration time of working anesthesia is of considerable interest, but unfortunately this is much more difficult to measure than the duration of numbness. Because the latter gives a much sharper end-point, the figures obtained are correspondingly more accurate and reliable, although considerably larger than the ones of direct practical interest.

The solution with the shortest duration was procaine 2 per cent with epinephrine. This might be expected since it is the solution with the lowest potency and accordingly is diluted by the tissue fluids beyond the threshold anesthetic concentration most rapidly. Of the more potent anesthetic solutions, the propoxycaine-procaine-levarterenol solution and the propoxycaine-procaine-nordefrin solution were the shortest in duration with no significant difference between the two. The procaine-tetracaine-nordefrin solution was next in order with the procaine-tetracaine-levarterenol solution producing the longest duration of anesthesia of the group. In operative procedures a relatively short duration may be desirable, since there is nothing to be gained in having deep anesthesia persist longer than is required for the particular operation. In oral surgery, however, it may be of advantage to alleviate postoperative pain for several hours through the use of a long-acting anesthetic solution. The data shown here enable the dentist to make a choice to fit the individual situation.

Amount of Bleeding • An attempt was made to determine the approximate amount of bleeding which occurred in the patients in whom surgical procedures were carried out, and for this purpose the amount of bleeding was classified into the three categories of slight, moderate and excessive. It is realized, of course, that different operators might use somewhat different criteria for classifying the observations into these three categories. Since any one operator will apply the same criteria to all of the solutions, however,

any personal differences will balance out in the large number of cases. Accordingly, the figures should still provide a fairly accurate idea as to differences between the various solutions. These figures are of value as a measure of the effectiveness of the vasoconstrictor, and are of significance with regard to the production and maintenance of a dry field for operation. There was actually little difference in the average incidence of bleeding with the three vasoconstrictors. This indicates that they are being used in substantially equivalent concentrations for the conditions present. It seems safe to conclude that all of the solutions are about equally satisfactory in this regard.

Reactions • Probably the most unpleasant features of local anesthesia from the standpoint of some patients are the immediate responses of nervousness, tremor, palpitation, nausea, headache and faintness, which are commonly referred to under the term "reactions." These are largely emotional in origin, but in the minds of many patients, particularly those who are somewhat apprehensive, they loom large and are more dreaded than the dental procedure itself. Therefore, any solution that might have a tendency to minimize these reactions would contribute significantly to the general comfort of the patient and to the relief of the operator.

It is realized, of course, that many and probably even the majority of reactions that accompany the injection of local anesthetics are psychic in origin and completely unrelated to the pharmacological effects of the solution *per se*. Since it is obviously impossible, however, for a clinician to distinguish between the two, all reactions that occur have been recorded as though they were caused by the solution. Since all of the solutions are judged by the same criteria, any differences that are seen may be considered as valid differences between the solutions. Other things being equal, it might be suspected that the lowest incidence of nervousness, palpitation, and so on, would be seen with that solution which produced the most profound anesthesia, since this would minimize the psychic effects of inadequate loss of sensation. This observation is in accord with the results. Although the solutions containing levarterenol were most satisfactory as far as relative freedom from reactions was concerned, a few headaches were reported with these solutions which were of greater severity and duration than the occasional milder ones observed with the other solutions. Evidence has been obtained from other data which indicates that the incidence of these severe headaches is low, being less than four or five out of every million injections. They subside usually fairly promptly without any untoward sequelae.

The propoxycaine-procaine-levarterenol solution had the highest proportion of complete freedom from systemic reactions, with 96.0 per cent. This was followed closely by the propoxycaine-procaine-nordefrin solution with 93.6 per cent. It is interesting to note that the two solutions with the highest potency, as determined in the laboratory on experimental animals, were also these same solutions. The clinical data indicate, however, that these two extremely potent solutions actually produce somewhat fewer systemic reactions than the conventional, less potent 2 per cent procaine with epinephrine. In fact, when the data in Tables 1 and 2 are analyzed, the impression is obtained that there is a definite relationship between the incidence of systemic reactions and the frequency of Grade A anesthesia.

In order to examine this possibility more fully, the five solutions were arranged in Table 3 in the increasing order of their ability to produce Grade A anesthesia. The data indicate that in a general way, the incidence of systemic reactions decreases as the incidence of satisfactory anesthesia increases. Applying the usual

Table 3 • Correlation between Grade A anesthesia and incidence of systemic reactions

Procedure	Solution	% Grade A anesthesia	% systemic reactions
Operative	Procaine 2%—tetracaine 0.15%—nordefrin 1:10,000	81.2	7.2
Operative	Procaine 2%—epinephrine 1:50,000 or 1:60,000	86.1	5.4
Operative	Procaine 2%—tetracaine 0.15%—levarterenol 1:30,000	87.1	6.3
Operative	Propoxycaine 0.4%—procaine 2%—nordefrin 1:10,000	87.9	5.2
Operative	Propoxycaine 0.4%—procaine 2%—levarterenol 1:30,000	90.8	3.3
	Coefficient of correlation (r) = 0.87		
Surgical	Procaine 2%—epinephrine 1:50,000 or 1:60,000	80.6	13.0
Surgical	Procaine 2%—tetracaine 0.15%—nordefrin 1:10,000	85.8	7.2
Surgical	Propoxycaine 0.4%—procaine 2%—nordefrin 1:10,000	88.7	7.9
Surgical	Procaine 2%—tetracaine 0.15%—levarterenol 1:30,000	89.8	10.3
Surgical	Propoxycaine 0.4%—procaine 2%—levarterenol 1:30,000	91.5	5.8
	Coefficient of correlation (r) = 0.63		

statistical methods, the coefficient of correlation for operative cases is 0.87 and for surgical cases 0.63. Although the correlation is not perfect (with perfect correlation $r=1.0$), it can be stated that the inverse relationship between satisfactory anesthesia and incidence of reactions found in this study could not be due to chance alone. Actually, this observation should not come as a surprise.

Very possibly, one important factor which contributes to this greater freedom from reactions is the feeling of confidence and security which comes to the patient who experiences the profound and deep anesthesia which is conferred by these more potent solutions. The patient feels that the operation ahead will be accomplished with complete freedom from pain and accordingly relaxes and sheds any feeling of apprehension that might otherwise be present.

Any local irritation that might be produced by a local anesthetic solution would manifest itself only after the anesthesia had completely worn off. Therefore, observations of the frequency of postoperative reactions have been included. These include edema, trismus, soreness and swelling at the site of injection. It is not always possible to distinguish between swelling, edema and soreness due to the injection, and that which may result from the surgical procedure itself. Because of this, it was necessary to ascribe all such reactions to the anesthetic solution itself. A study of the figures under this heading shows that the percentage of patients showing no reactions ranged between 97.7 and 99.4 per cent. The differences between the five solutions, therefore, can be regarded as unimportant. It seems safe to conclude that they are all completely satisfactory in that they induce no significant postoperative tissue reactions.

SUMMARY AND CONCLUSIONS

A series of observations on 13,908 patients injected with six different local anesthetic solutions has been made by approximately 300 practicing dentists in order to report clinical experience with them.

Solutions containing propoxycaine, a new local anesthetic, produced a high incidence of completely satisfactory anesthesia with a more infrequent need for reinjection. At the same time, the average speed of onset of anesthesia from the propoxycaine combinations was the fastest yet observed with any available solutions under comparable conditions of use. This increased potency and fast onset were not purchased at the expense of unduly longer duration nor at the expense of clinical tolerance.

In these propoxycaine-containing formulations, a higher degree of over-all efficacy has been achieved.

The use of cephalometric headplate measurements in full denture prosthesis

Robert F. Schoenwetter, D.D.S., M.S., Oshkosh, Wis.

Normal function of the masticatory apparatus is dependent on many interrelated factors. The facial growth of the individual is paramount, and then a normal dentition and normal function of the muscles of mastication and deglutition.

This report concerns a young girl, aged 17, some of whose teeth were congenitally missing.

Brodie and Sarnat[1] in 1942 reported an instance of a boy with anodontia; this report demonstrated that the skeletal and facial growth patterns evolve normally without the influence of the deciduous and permanent teeth. The boy's facial growth pattern indicated that the basal maxillary and mandibular bones were within normal range for a boy his age.

The alveolar processes—that is, the bony processes surrounding the teeth—are the product of the eruption and function of the teeth. In cases of anodontia or oligodontia, the alveolar processes are either partially or completely missing, depending on the number of teeth present. Naturally, the absence of the alveolar processes observed in a person with anodontia is the reverse of that observed in an edentulous person where the teeth have been extracted and the processes, because of the loss of teeth, have resorbed.

If facial growth in the vertical measurement is normal and the alveolar processes are underdeveloped because of oligodontia or anodontia, an excessive freeway space is present. This freeway space may be described as the space between the maxillary and mandibular teeth, or in the edentulous person, as the space between the maxillary and mandibular ridges when the mandible is at rest.[2]

1. Brodie, A. G., and Sarnat, B. G. Ectodermal dysplasia (anhidrotic type) with complete anodontia. Am. J. Dis. Child. 64:1046 Dec. 1942.

2. Thompson, J. R. Rest position of the mandible and its significance to dental science. J.A.D.A. 33:151 Feb. 1946.

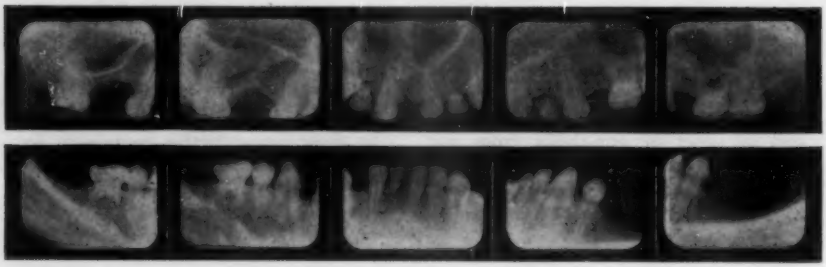


Fig. 1 • Full-mouth view showing number, size and form of permanent teeth present

In instances of anodontia, where the teeth and alveolar processes are absent, this space is larger than normal as a result of the normal growth of the mandibular condyle. With the lack of growth resulting from the absence of the influence of erupting teeth, growth at the condyle gradually separates the maxillary and mandibular bases farther and farther. This process eventually ends with the large freeway space that is found in persons with anodontia. Such a space must be reduced in order to prevent overclosure of the mandible in its normal functions.

REPORT OF CASE

Clinical and roentgenographic examinations of a young girl, aged 17, revealed the presence of 15 permanent and 5 deciduous teeth. The maxillary central incisors were deformed in shape and all four cuspids were pegshaped (Fig. 1). Her history revealed that her father, one brother and one sister had congenitally missing teeth.

Dental casts were made which showed the development of the dental units and the alveolar processes (Fig. 2, left). The sharp narrow ridges demonstrated the

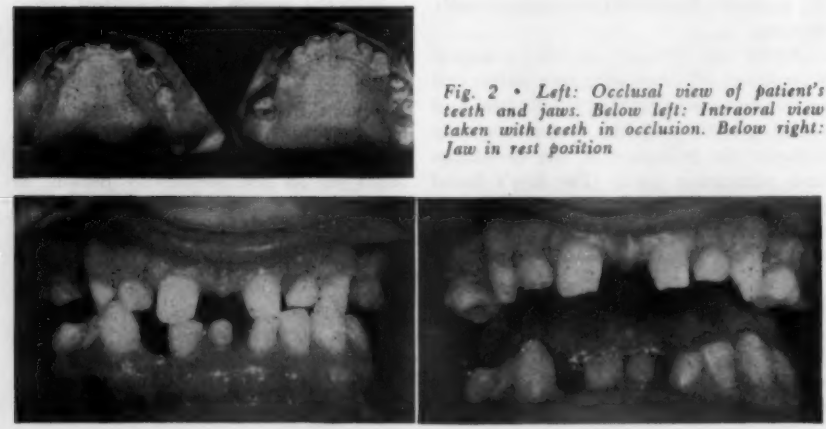


Fig. 2 • Left: Occlusal view of patient's teeth and jaws. Below left: Intraoral view taken with teeth in occlusion. Below right: Jaw in rest position

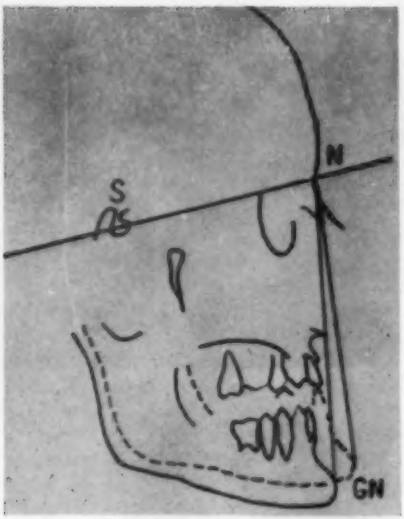


Fig. 3 • Tracing of headplates, taken at rest position and in occlusion with natural teeth, were superimposed to demonstrate vertical measurement in each position

lack of alveolar bone. Intraoral views were taken with the teeth in occlusion and the jaw in rest position (Fig. 2, below).

Headplates were taken with a Thurow cephalometer with the teeth in occlusion and the jaw in rest position (Fig. 3). Measurements from the tracings of the headplates revealed that the vertical height from nasion to gnathion was 109 mm. when the jaw was in rest position and 100 mm. when it was in occlusion, indicating an excessive freeway space of 9 mm.

After study of the roentgenograms, casts and headplates, orthodontic treatment was ruled out. After consultation with the girl's family dentist, it was decided that partial dentures were a mechanical impossibility; therefore, full upper and lower immediate dentures were decided on as most satisfactory.

The usual immediate denture technic was used by her dentist. When he was ready to measure the vertical dimension with the occlusal rims and biteblocks, the vertical height was approximated and then checked with the headplates. The aim was to have the distance from nasion to gnathion with the teeth in occlusion 106 mm., thus allowing 3 mm. freeway space. The dentures were completed and inserted and another headplate taken to check again the vertical measurement (Fig. 4).

Figure 5 shows the patient before and after treatment.

This incident is a practical demonstration of cooperation between the orthodontist and the general practitioner in the treatment of a patient with an extreme freeway space. Cephalometric headplate measurement is an exact

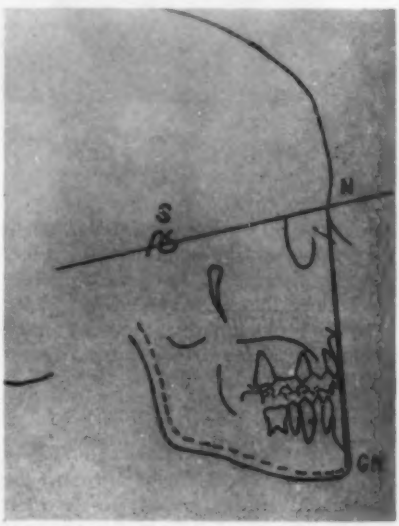


Fig. 4 • Tracings of headplates taken of natural teeth with jaw in rest position and one taken with dentures inserted in occlusion. Dotted lines indicate headplate taken with dentures inserted

Fig. 5 • Profile and frontal views of patient before and after treatment

method of measuring the vertical height for denture prosthesis and is a permanent record which may be used at any future date. Since the measurements are taken from bony landmarks, they are more stable and accurate than measurements taken on soft tissue.

SUMMARY

1. The vertical height from the frontonasal suture (nasion) to the most prominent point of the anterior aspect of the mandible (gnathion) was measured on the tracings of the headplate roentgenograms that were taken of a patient with oligodontia. The jaw was at rest position and the teeth were in occlusion.

2. The rest position was determined as an actual measurable distance of 109 mm.

3. The vertical measurement taken with the natural teeth in occlusion was 100 mm., and with the dentures inserted was 106 mm., which left a freeway space of 3 mm. that was well tolerated by the patient.

4. The patient's appearance was changed to a more pleasing one and her masticatory efficiency was restored.

46 Washington Boulevard

Incidence of the small dens in dente

Everett R. Amos, D.D.S., Indianapolis

The term dens in dente in the past has referred to a markedly malformed tooth in which an invagination has occurred. If one accepts the definition of Kitchin[1] that a dens in dente is the result of maldevelopment of a single tooth because of an abnormal invagination and subsequent degree of enclosure of tooth substance normally confined to an outside surface, then it becomes evident that there is only a difference in degree between the classical dens in dente, as exemplified by the distorted tooth in Figure 1, left, and the normally-shaped tooth in Figure 1, right. The latter tooth, no less than the former, has an enclosure of tooth substance normally confined to an outside surface and therefore is as much a dens in dente as the example in Figure 1, left.

This anomaly is so rare that it was not until 1947 that a case of bilateral dens in dente was reported in the literature. Since that time I have been able to find reference to only three other such cases, the last one reported by Toto[2] in 1953.

Hine,[3] however, considered the small, expanded invagination to be a dens in dente and in 1936 prepared an exhibit demonstrating the gradations of invaginations from the shallowest of lingual pits through the small dens in dente in this study to the huge deformed invaginations which were once thought to be the only dens in dente.

Atkinson[4] also considered the small invagination to be dens in dente, and in 1943 in a roentgenographic survey of 500 patients found that 10 per cent were so affected. He did not specify, however, just what constituted his requirements.

Shafer[5] in 1953 in a roentgenographic survey of patients edentulous and otherwise found that 1.3 per cent showed clear evidence of expanded invaginations.

Also in 1953 Hallett[6] examined roentgenograms of 586 orthodontic patients whose ages ranged from 2 to 15. He found an incidence of 6.6 per cent of what he termed Class III and Class IV palatal invaginations of the incisors, which were expanded invaginations. He preferred to restrict the term dens in dente to the large invaginations.

INVESTIGATION

The present study was based on the examination of 1,000 sets of full mouth roentgenograms of patients passing through the oral diagnosis clinic, but certain exclusions were made: No set was considered unless the lateral incisors were present, and no set was considered if the patient was negro. The reason for

Department of oral diagnosis, Indiana University School of Dentistry.

1. Kitchin, P. C. Dens in dente. Oral Surg., Oral Med. & Oral Path. 2:1181 Sept. 1949.

2. Toto, P. D. Bilateral dens in dente. Oral Surg., Oral Med. & Oral Path. 6:662 May 1953.

3. Hine, M. K. Personal communication.

4. Atkinson, S. R. Permanent maxillary lateral incisor. Am. J. Orthodont. & Oral Surg. 29:685 Dec. 1943.

5. Shafer, W. G. Dens in dente. New York D. J. 19:220 May 1953.

6. Hallett, G. E. M. Incidence, nature and clinical significance of palatal invaginations in the maxillary incisor teeth. Proc. Roy. Soc. Med., Sec. Odont. 46:491 July 1953.

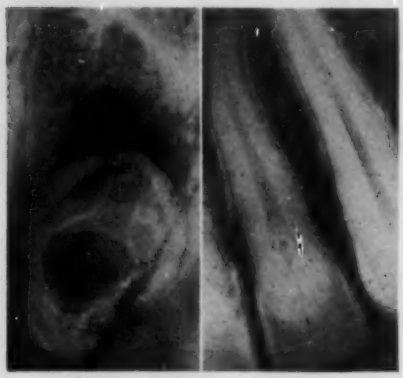


Fig. 1 • Left: Classical dens in dente. Right: Small dens in dente

Fig. 2 • Invagination of all four incisors

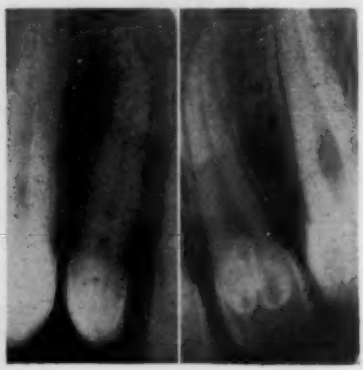


Fig. 3 • Left: Double-chambered invagination from incisal tip. Right: Small dens in dente. Note continuity of enamel over cusps and down into dens

the latter exclusion is that the phenomenon is truly rare in the Negro race, perhaps because there is a more harmonious relation of jaws to teeth in that race than there is in the American white, whose ancestry so often is mixed, with the result that jaws and teeth are often out of proportion. Atkinson[4] considers lack of normal development of the jaw and consequent constriction of the arch to be the main factors in malformation of a dens in dente.

The findings of the survey are shown on Table 1. In addition to the breakdown shown, there were five instances in which the central incisor also showed deep invaginations but not always of the expanded type. One such instance is shown in Figure 2.

There was one instance in which there was an invagination in one of the central incisors with none of the other teeth affected, but since the study was concerned with lateral incisors only, this was not included in the total. The instances of dens in dente were nearly evenly divided between the sexes, as 26 instances occurred in women and 25 in men. If the unique central incisor were counted, then the number of instances would have been evenly divided.

Two single left lateral incisors of the peg type were noted (Fig. 3, left). As is usual in teeth of this type, the invagination occurred on the incisal tip as contrasted to the lingual pit invagination that occurs on the more normally-shaped lateral incisors. An unusually clear conformation of enamel covering the two

Table 1 • Incidence of dens in dente in upper lateral incisors of white adult clinic patients

Subjects	Bilateral	Left lateral incisors	Right lateral incisors	Total	Percentage
1,000	22	17	12	51	5.1

Table 2 • Incidence of dens in dente in upper lateral incisors of dental students

Subjects	Bilateral	Left lateral incisors	Right lateral incisors	Total	Percentage
203	4	5	5	14	6.9

lingual cusps and continuing on down into the dens in dente was noted also (Fig. 3, right).

The subjects for the survey were adults of all ages, but comparatively few were in the lower age ranges. Because most of the patients going through the clinic were older, their lateral incisors had had opportunity to undergo the vicissitudes of time; certainly all instances of early exposure because of incomplete closure or decay of a patent dens in dente had gone the way of such frailties and never were counted. Consequently, the percentage of dens in dente in such patients would be lower than in a younger aged group.

As a contrast to the survey of clinic patients, a survey was conducted of dental students of the upper three classes who had had full mouth roentgenograms made (Table 2). The results are comparable to those of Hallett (who found an incidence of 6.6 per cent), even though the average age of the dental students was approximately 25 years.

CONCLUSION

If a dens in dente is defined as a maldevelopment of a single tooth resulting from abnormal invagination and subsequent degree of enclosure of tooth substance normally confined to an outside surface, then this anomaly occurs in approximately 6 per cent of the white race.

Basic Research • The term research is itself a source of confusion. Research means simply a careful systematic or diligent search for facts or principles. It comes from an old French expression meaning "to seek again." In general and proper usage, one finds library research, historical research, legal research, industrial research, clinical research, and scientific research. *Scientific* is no more a necessary adjective for *research* than *damn* is for Yankee! Scientific and basic research are special restrictions of the general term. *Ward Pigman, "Wanted: More Ivory Towers," The Scientific Monthly 80:253 April 1955.*

Cementation and esthetic problems in crown and bridge procedures

Edward J. Sullivan, D.D.S., Evanston, Ill.

Many of the problems in dentistry relative to esthetics and cementation are not related to the materials themselves but stem rather from lack of knowledge regarding their use. A beautifully constructed crown or bridge will fail in the mouth if the abutment teeth are unduly abused or if the restoration has not been considered as a part of the whole dental mechanism. Cement alone will not compensate for the shortcomings of a poor diagnosis, nor will proper esthetics insure a long life of usefulness for a restoration. Success or failure in crown and bridge prosthesis depends on faithful adherence to the principles of sound dentistry and on an understanding of the materials that are used daily in practice. Esthetics and cementation are only two branches of the complicated subject of crown and bridge, both based on these same principles of sound dentistry.

The importance of correct diagnosis cannot be overemphasized, nor can the need for roentgenographic interpretation, study casts, vitality tests, correction of occlusal disharmonies and other prerequisites of sound construction be stressed too often.[1] The possibility of periodontal damage from improper contact points and contours,[2-4] overhanging margins and other mechanical irritants must be borne in mind.[5-7] Since there are, fundamentally, two sets of specifications for a restoration, periodontal and mechanical, attention to the smallest detail is necessary to give the protection needed by the supporting structures if periodontal destruction is to be avoided.[8] Undoubtedly the maintenance of the freeway space[9] and the proper consideration of occlusion[10] are also necessary, especially in full mouth rehabilitation. In discussing crown and bridgework, however, it is not necessary to enter into the controversy regarding the relative merits of anatomic interdigitating cusps or shallow modified cusps.[11] In crown and bridge-

Presented as a postgraduate lecture at the U. S. Naval Dental School, Bethesda, Md., May 28, 1954.

Editor, Fortnightly Review of the Chicago Dental Society.

1. Nuttel, E. B. Diagnosis and correction of occlusal disharmonies in preparation for fixed restorations. J.A.D.A. 44:399 April 1952.

2. Hirschfeld, I. Food impaction. J.A.D.A. 17:1504 Aug. 1930.

3. Goldman, H. M. Relationship of the gingival crevice and the alveolar crest. J. D. Res. 21:561 Dec. 1942.

4. Brodie, A. G. Significance of tooth form. Angle Orthodont. 4:41 Jan. 1935.

5. Spalding, G. R. Gingivitis. J.A.D.A. 23:2021 Nov. 1936.

6. Thomas, B. O. A. Relationship of operative procedures to the health of the periodontal tissues. J.A.D.A. 39:522 Nov. 1949.

7. Hine, M. K. Fibrous hyperplasia of gingiva. J.A.D.A. 44:681 June 1952.

8. Romine, E. R. Relation of operative and prosthetic dentistry to periodontal disease. J.A.D.A. 44:742 June 1952.

9. Frechette, A. R. Partial denture planning with special reference to stress distribution. J. Pros. Den. 1:700 Nov. 1951.

10. Tinker, H. A. Some essentials of crown and bridgework. North-West Den. 28:29 Jan. 1949.

11. Bronstein, B. R. Evaluation of basic concepts in mouth rehabilitation. J. Pros. Den. 1:560 Sept. 1951.

work the occlusal patterns formed by the masticatory processes of the patient can be followed.[12]

In considering the materials to be used in obtaining esthetic effects or for use in cementation, their effect on tooth structure and the dental pulp should be taken into account first. Then the material itself can be considered—how it is used and abused, the basic concepts of color, and finally how this knowledge may be applied in everyday practice.

THE PULP AND ITS PROTECTION

In the past, in discussing pulp protection, greatest emphasis has been laid on the fact that abutment preparations necessitated tremendous amounts of heat. Recently, the *in vivo* studies of Lisanti and Zander[13] have raised some doubt as to the importance of this. They showed that the dentin acts as an excellent heat dissipater, and that when a temperature of 600° F. was applied for one minute to the base of a cavity in a tooth, 0.93 mm. of dentin was so efficient in reducing heat that the pulp temperature rise was only 91.5° F. They also observed no pulp deaths from the tests, and all pulps healed regardless of the temperature.

Other studies, however,[14-16] show that some physiological changes occur when the temperature is raised above 130° F., especially in the dentin. In addition, it is known that heat can cause blister formation and inflammatory changes in the pulp. It must be remembered, also, that excess amounts of heat will cause the tooth to be unduly sensitive, especially after the cementation of the restoration. Some form of coolant is needed for the comfort of the patient and also from a physiologic standpoint. The best coolant for rotating instruments appears to be plain water at mouth temperature.[17] Air is the next best coolant, with the combination of air and water being third. The employment of diamond stones, tungsten-carbide burs and high speeds appears to be harmless to the pulp, but a coolant should be used as an added precaution. Since the maximum rise in temperature is noted within ten seconds of the beginning of the cutting operation, any "bearing down" on the instrument should be avoided.

Pulp damage, once considered to be due primarily to mechanical and temperature abuses, should now be re-evaluated. Probably the greatest nonbiotic cause of pulp deaths is chemical reaction —the result of the ingredients used in filling materials, cements and in sterilization. The major biotic causes of pulp deaths continue to be the process of decay, viruses and pathogenic bacteria. All of the afore-mentioned irritants must be considered capable of destroying the dental pulp but, fortunately, the greater majority cause little or no damage.

Since the turn of the century, controversy has raged regarding the effect of cements and other filling materials on the pulp. Finally in the early thirties it was realized that the pulp and dentin were closely related tissues and that any injury to the dentinal fibrils of the odontoblasts caused a reaction at their pulpal ends.[18,19] Without going too deeply into the histologic picture of inflammation of the dental pulp and the repair mechanism or breakdown of this tissue, suffice

12. Nelson, E. A. Significant factors in occlusal restoration by means of crown and bridge prosthesis. Pennsylvania D. J. 16:3 Jan. 1949.

13. Lisanti, V. F., and Zander, H. A. Thermal injury to normal dog teeth: in vivo measurements of pulp temperature increases and their effect on pulp tissue. J. D. Res. 31:548 Aug. 1952.

14. Jeserich, Paul H. Factors necessary to minimize thermal changes in tooth structures from operative procedures. New York J. Den. 5:275 Dec. 1935.

15. Henschel, C. J. Heat impact of revolving instruments on vital dentin tubules. J. D. Res. 22:323 Aug. 1943.

16. Henschel, C. J. Development of thermal control. J.A.D.A. 33:194 Feb. 1946.

17. Peyton, F. A. Temperature rise and cutting efficiency of rotating instruments. New York D. J. 18:439 Nov. 1952.

18. Fish, E. W. An experimental investigation of enamel, dentin and dental pulp. London, John Bale Sons and Danielsson, 1933.

19. Seltzer, S. Medication and pulp protection for the deep cavity in a child's tooth. J.A.D.A. 39:148 Aug. 1949.

it to say that the pulp either reacts favorably or unfavorably to an irritation or stimulus. If the former occurs, secondary dentin is laid down as a defensive barrier. If an unfavorable reaction occurs, the breakdown of tissue leads to formation of pus and its sequelae.

The most commonly used metallic fillings—amalgam and gold—apparently are not in themselves irritating to the pulp, regardless of the depth of the cavity.[20] The amount of secondary dentin laid down under many of these fillings indicates that the pulp has reacted more to thermal changes than to the fillings. Since the presence of secondary dentin indicates stimulation potentials, the use of sedative or protective bases is indicated in deep cavities.

By far the most irritating materials are the dental cements,[21-24] which include the silicate as well as the zinc and copper oxyphosphate cements. Undoubtedly the orthophosphoric acid is exceedingly irritating to the dental pulp, for a normal mix of cement has a pH of less than 2.0 and is approximately 50 per cent free acid.[25] This tends to reduce the normally alkaline tissue fluids of the dentin as well as the pulp, destroying the odontoblasts and initiating the destruction of the dental pulp.[26] Phosphoric acid is even strong enough to attack enamel.[27] The so-called cavity varnishes have little, if any, effect in protecting the dental pulp from these acids,[28] but they do help in the reduction of thermal shock. There is a class of cements, however, commonly called the sedative group that, as a rule, does not use phosphoric acid as a liquid. These cements are primarily the zinc oxide and eugenol types which usually also contain zinc acetate and some form of rosin. They have a crushing strength about one seventh that of the zinc phosphate cements, and they make acceptable cement bases, since the eugenol is utilized as an anodyne to protect the pulp. A much stronger cement base or sedative filling is zinc phosphate cement with equal parts of eugenol and cement liquid.[25] This cement mix is approximately three quarters as strong as regular cement, has adequate retentive powers, sets a little faster, but can utilize the eugenol as an anodyne without neutralizing the orthophosphoric acid of the liquid.

Studies in pulp-capping,[29-31] especially in the use of sedative bases of calcium hydroxide and zinc oxide in a chloroform solution of polystyrene or calcium hydroxide and methyl cellulose paste,[32] indicate a step in the right direction in protection of the dental pulp. Cement bases have been abused tremendously, and one common practice that should be avoided is to leave decay in place until the inlay is ready to be cemented. This practice only helps to drive free hydrochloric acid into the dentinal tubules. It is better to place the cement bases, finish the cavity preparation and then make the inlay.

It is too early to tell the exact nature of the relation of the direct and indirect filling resins to the dental pulp and, as could be expected this early, investiga-

20. Seelig, A. Practical evaluation of histologic findings of effects of filling materials on the pulp. New York J. Den. 21:353 Oct. 1951.

21. Zander, H. A. Reaction of dental pulps to silicate cements. J.A.D.A. 33:1233 Oct. 1946.

22. Shroff, F. R. Effects of filling materials on the dental pulp: an histological experimental study with special reference to synthetic porcelain. New Zealand D. J. 42:99 July; 42:145 Oct. 1946.

23. Manley, E. B. Investigations into the early effects of various filling materials on the human pulp. D. Record 62:1 Jan. 1942.

24. Harvey, W.; LeBrocq, L. F., and Rakowski, L. Acidity of dental cements. Brit. D. J. 77:61 Aug. 4, 1944.

25. Mosteller, J. H. Evaluation of intermediate base materials. J.A.D.A. 43:571 Nov. 1951.

26. Pulp reaction to operative procedures. Lederle Newsletter, 1953.

27. Docking, A. R., and others. Effect of orthodontic cements on tooth enamel. D. Record 72:243 Oct. 1952.

28. Zander, H. A., and Pejto, I. Protection of the pulp under silicate cements with cavity varnishes and cement linings. J.A.D.A. 34:811 June 15, 1947.

29. Glass, R. L., and Zander, H. A. Pulp healing. J. D. Res. 28:97 April 1949.

30. Easlick, K. A. Management of pulp exposure in the mixed dentition. J.A.D.A. 30:179 Feb. 1943.

31. Rosenstein, S. N. Pulp capping in deciduous teeth: report of a ten year study. J.A.D.A. 29:1632 Sept. 1942.

32. Berk, H. Effect of calcium hydroxide-methyl cellulose paste on the dental pulp. J. Den. Child. 17:65, 4th quart. 1950.

tions do not completely agree.[33-35] There are indications, however, that the polymerization process against the tooth tissues occasionally produces inflammatory changes, but that this usually subsides and the pulp returns to normal.[36] The long-range success or failure of the resins so far as the pulp is concerned probably rests on whether, like the cements,[37] they produce changes in the dentin which will obliterate many of the dentinal canaliculi, thus solidifying the dentin immediately under the restoration. At the present time the controversy as to whether or not to use the direct filling resins is based primarily on the clinical picture rather than on the histologic.[38-40]

Cavity sterilization, once considered so essential in a successful restoration, should now be reconsidered in the light of present knowledge. It is doubted whether actual sterilization of a cavity is feasible[41] or really necessary. It has been shown that the most common sterilizing agents—alcohol, hydrogen peroxide and phenol[42]—have no therapeutic value and in reality do more harm than good. The filling materials hermetically seal the dentin and any microorganisms left in the dentin either remain dormant or die from lack of moisture. Only by seepage from the margin of the restoration can the carious process again be started.[43-45] The toxins from the dead bacteria may, after many years of an otherwise successful restoration, cause pulpitis or even death of the dental pulp,[46-48] but fortunately these instances are rare.

Silver nitrate, although found to be only 28 per cent effective for sterilization,[46-48] is still the agent of choice for posterior teeth,[49] not only because of its ability to penetrate carious dentin and decalcification,[50] but also because it can penetrate the dentinal tubules, even to the pulp without any apparent pulpal damage. This occurs with or without secondary dentin formation.[51] It must be remembered, however, that if the precipitating agent is applied first to the tooth structure and is followed by the silver nitrate, only surface penetration may occur.

Recent investigations by Colton and Ehrlich[41] have shown that the direct filling resins have no bactericidal effect and therefore play no part in the prevention of recurrent decay, but silver amalgam, silicate cements and the zinc cements do. The addition of antibiotic agents not only increases the bactericidal action of the cements but also gives some bactericidal properties to the direct-filling resins. When either oxyphosphate of zinc cement or zinc oxide and eugenol are

33. Zander, H. A. Effect of self-curing resins on the dental pulp. Oral Surg., Oral Med. & Oral Path. 4:1563 Dec. 1951.

34. Seelig, A. Effect of direct filling resins on the tooth pulp. J.A.D.A. 44:261 March 1952.

35. Lefkowitz, W.; Seelig, A., and Zachinsky, L. Pulp response to a self-curing acrylic filling material. New York D. J. 15:376 Aug.-Sept. 1949.

36. Paffenberger, G. C.; Nelsen, R. J., and Sweeney, W. T. Direct and indirect filling resins: a review of some physical and chemical properties. J.A.D.A. 47:516 Nov. 1953.

37. Bodecker, C. F. W. Anatomy and pathology of the teeth. Philadelphia, S. S. White Dental Mfg. Co., 1894, p. 323.

38. Kraus, E. E., and Kraus, L. L. Evaluation of the auto-polymer direct plastic filling materials.* (Abst.) J. D. Res. 30:498 Aug. 1951.

39. Rosen, R. Plastics—today's $64 question. J. Missouri D. A. 32:229 July 1952.

40. Coy, H. D. Direct resin fillings. J.A.D.A. 47:532 Nov. 1953.

41. Colton, M. S., and Ehrlich, E. Bactericidal effect obtained by addition of antibiotics to dental cements and direct filling resins. J.A.D.A. 47:524 Nov. 1953.

42. Bartels, H. A. Consultant symposium: Our empiric cavity sterilization. New York D. J. 17:3 Jan. 1951.

43. Frisbie, H. E., and Nuckolls, J. Caries of the enamel. J. Am. Col. Den. 13:84 June 1946.

44. Besic, F. C. Fate of bacteria sealed in dental cavities. J. D. Res 22:349 Oct. 1943.

45. Frisbie, H. E., and Nuckolls, J. Histopathological study of caries of the human enamel operating beneath apparently sound and intact enamel surfaces. J. D. Res. 26:181 June 1947.

46. Seltzer, S. Bacteriologic status of the dentin after cavity preparations. J.A.D.A. 27:1799 Nov. 1940.

47. Seltzer, S. Effective duration of some agents used for dentin sterilization. J. D. Res. 21:115 April 1942.

48. Seltzer, S. Comparative value of various medicaments in cavity sterilization. J.A.D.A. 28:1844 Nov. 1941.

49. Ireland, R. L. Ammoniacal silver nitrate as sterilizing agent for deep-seated decay in deciduous teeth. J.A.D.A. 26:871 June 1939.

50. Stephan, R. M.; Dorfman, A., and Muntz, J. A. In vitro studies on sterilization of carious dentin. III. Effective penetration of germicides into carious lesions. J.A.D.A. 30:1905 Dec. 1943.

51. Rabinowitch, B. Z. Ammoniacal silver nitrate: study of its value in operative dentistry today. J. Den. Children 18:22, 2nd quart. 1951.

placed over an exposed pulp, abscess formation and liquefaction necrosis occur. However, if a paste is made of tap water, penicillin G potassium and calcium carbonate, a new bridge of dentin is formed over the exposure and normal pulps result. This technic eventually may prove successful in instances of carious exposures where infection has been introduced into the dental pulp.[52] The use of antibiotics has been advocated,[53] and it appears that the future of the sterilization of cavities may well lie in the incorporation of antibiotics into filling materials and dental cements.

FILLING MATERIALS

The first substance to be considered is dental cement. The National Bureau of Standards[54] classifies cements into four groups: in the first group is the zinc oxychloride (with saturated solution of zinc chloride as the liquid) and the zinc eugenol cements, mentioned earlier, that are used primarily for sedative fillings or as a temporary cement. In the second group is the copper phosphate and zinc phoshate cements used for antiseptic fillings and cementation of appliances. The third group actually is comprised of the cements of the first two groups to which have been added copper, mercury or silver salts to increase their germicidal properties. The fourth group consists of the silicate and the zinc phosphate-silicate cements used for fillings and cementation. The liquid used for the last three groups is usually an aqueous solution of phosphoric acid, to which has been added zinc or aluminum salts.

Silicate Cements • The silicate cements differ radically from the zinc phosphates. They usually are made of silica, alumina, lime and flux and when mixed with the liquid, undergo a complicated chemical change, forming a gel. In order to be used as a cementing medium, thin mixes must be made which then increase the amount of acid available for absorption into the dentinal tubules before the mass sets. It is during this time that silicates are potentially harmful for it has been shown that after a week's time they are practically neutral.[55] Other reasons for not using the silicates for cementation purposes are their brittleness and their inability to absorb shock, their tendency to dissolve and disintegrate and, finally, since most silicates contain at least 10 per cent fluorine, their danger to the dental pulp which cannot be minimized.[56]

Zinc Phosphate Cements • The zinc phosphate cements are by far the most common agent used for cementation and, in spite of many abuses by the profession, do a reasonably good job. They are composed primarily of zinc oxide, with some magnesium oxide, silica, and other heavy oxides. Unlike the silicates, the zinc phosphate cements form compounds that are crystalline in nature, absorb more shock, have a lower solubility in the mouth and do not contain fluorine. The exact chemical change is not known, but the zinc oxide with its modifiers, when mixed with phosphoric acid, forms a solid which is a different compound, oxyphosphate of zinc.[57]

There are two schools of thought as to how the zinc phosphate cements retain a restoration. The first believes that since the tooth substance is rich in calcium and magnesium phosphates and since phosphoric acid has a strong affinity for cal-

52. Seelig, A.; Fowler, R. C., and Tanchester, D. Effect of penicillin G potassium plus calcium carbonate on surgically exposed dental pulps of the rhesus monkey. J.A.D.A. 48:532 May 1954.

53. Roth, L. H. Aureomycin as applied to deciduous teeth. New York J. D. 22:213 May 1952.

54. Souder, W., and Paffenbarger, G. Physical properties of dental materials. Circular 433. U. S. Dept. of Commerce, National Bureau of Standards. Washington, D. C., Government Printing Office, 1942.

55. Crowell, W. S. Physical chemistry of dental cements. J.A.D.A. 14:1030 June 1927.

56. Rovelstad, G. H., and St. John, W. E. Condition of the young dental pulp after the application of sodium fluoride to freshly cut dentin. J.A.D.A. 39:670 Dec. 1949.

57. Welden, F. S. Cementing gold inlays. D. Items Interest 44:174 March 1922.

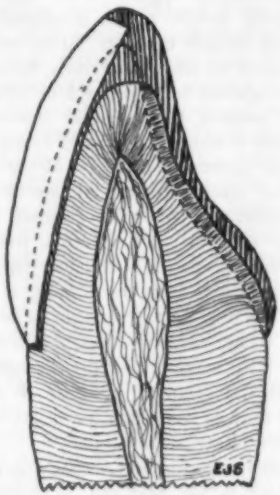
cium and magnesium as well as for gold, the retentive force is chemical in nature.[57] The second school of thought, and probably the more accurate, believes that there is a frictional retention between the cavity wall and the inlay and the cement only closes the gap between the two, locking the inlay in place by the gripping of the individual crystals in the cement mass.[58]

Acrylic Resins • There have been controversies regarding the use of the acrylic resins ever since their introduction in dentistry. Since they have been adapted fairly recently to crown and bridge prosthesis, some mention should be made of their shortcomings.

The resins are by far the most natural-appearing material used in dentistry today, therefore, they are potentially best esthetically for crown and bridgework.[59] Failures in their use usually are due to a lack of adequate knowledge of the material and its limitations rather than to a lack in the material itself.[60] The advent of the Nealon technic[61] has eliminated many of the problems, and even though the direct filling resins do not reach the technical specifications of the indirect, they still are perfectly capable of meeting clinical requirements[62] and are far easier to handle.

It is known now that plastic resins have a tendency to change color, especially the yellows which tend to become more yellow;[63] also, that many of the strains and much of the crazing has been due to dry polishing.[64] By far the most important fact that has been learned is the susceptibility of the resins to wear and their lack of resistance to recurrent decay. Therefore, the use of plastic resins for jacket crowns and stress-bearing bridges is contraindicated;[65] in order to be used properly, the tooth and occlusion must be protected by metal[66] (Fig. 1). This is true not only for crowns but also for pontics. Some writers even advocate having gold rather than resin on the gingival

Fig. 1 • When plastic resin is used, tooth should be covered with gold in full crown coverage. Relation between enamel, dentin and pulp to completed restoration is shown



surface.[59] Highly polished gold is said to accumulate less debris and calculus-like material than plastic resin; evidence, however, appears to place the resins above gold but below polished porcelain in the preference scale.

The tooth should be protected by metal because all of the restorative materials,

58. Gillett, H. W., and Irving, A. J. Gold inlays by the indirect system. D. Items Interest 50:339 May 1928.

59. Yock, D. H. Indications for the use of plastic resins in crown and bridge. J.A.D.A. 46:505 May 1953.

60. Starr, F. C. Acrylic in jacket crowns and bridge pontics. J. Pros. Den. 2:543 July 1952.

61. Nealon, F. H. Acrylic restorations: operative nonpressure procedure. J. Pros. Den. 2:513 July 1952.

62. Peyton, F. A.; Shiere, H. B., and Delgado, V. P. Some comparisons of self-curing and heat-curing denture resins. J. Pros. Den. 3:332 May 1953.

63. Caul, H. J., and Schoonover, I. C. The color stability of direct filling resins. J.A.D.A. 47:448 Oct. 1953.

64. Leader, S. A. Acrylic crazing: its significance, prevention and treatment. Brit. D. J. 87:205 Oct. 21, 1949.

65. Coy, H. D. An evaluation of acrylic resin as a restorative material. J.A.D.A. 48:266 March 1954.

66. Rank, A. Die Hohlfacette aus Kunststoff bei Kronen-und Brücken-arbeiten. Zahnartzl. Rdsch. 61:374 July 5, 1952.

after insertion in the mouth, exude fluids from the margins of the restorations when the teeth have been subjected to extreme temperature changes.[67] This applies to cast gold, acrylic resins, amalgam, gold foil and silicate cements. After being in the mouth for some time, only the acrylic resins continue to seep. Lack of recurrent caries around the metallic restorations probably is due to the spaces being filled with the corrosion products of the filling material, while with the silicate cements, the amount of fluorides combat decay. In the case of acrylic resins, however, because of their high thermal expansion and continued fluid exudation, a space of 10 microns at the margin is not unusual, which permits the development of caries. This accounts for the discoloration seen at the gingival margins of acrylic jacket crowns and their eventual failure as a dental restoration.

Another development has been the introduction by McLean in 1948[68] of acrylic cements. He showed that by using 1,000 to 2,000 mesh polymers instead of the usual 120 to 140, approximately half as much monomer was needed to obtain a workable dough. He was one of the first to incorporate in the polymer benzoyl peroxide, and a further catalyst, nitrogen trihexylamine. The working properties of acrylic cement seem to compare favorably with those of oxyphosphate cement, but the acrylic cements are far superior in their performance in the impact fatigue test. Although originally suggested by Tylman,[69] acrylic cements remained undeveloped until it was shown recently by Stockton[70] that they could be used to compensate for the difference in the coefficient of linear expansion and contraction of acrylic restorations, and also compensate for the inability of the acrylic restorations to adhere to tooth structure. The greater amount of polymerization takes place outside of the mouth, then the restoration is inserted for final polymerization, removed, and is then cemented in place with a plastic cement and polished. Whether the use of plastic cements will overcome the shortcomings of the resins, only time and research can tell.

Hydrocolloid and Alginate Impression Materials • Increased interest in the use of the hydrocolloids[71-76] as well as the alginates[77-79] as impression materials has spotlighted some of their shortcomings. Placing complete reliance on their accuracy, however, will only lead to unsuccessful bridges and crowns. The limitations of these materials must be realized, and they should be used only on short spans and where conditions are ideal. Although both the hydrocolloids[80] and the alginates[81] are capable of being electroplated, much still remains to be desired with regard to dimensional change and accuracy. Other undesirable features of the hydrocolloids and alginates are the critical temperature of the mix of material, the questionable use of stone master

67. Nelsen, R. J.; Wolcott, R. B., and Paffenberger, G. C. Fluid exchange at the margins of dental restorations. J.A.D.A. 44:288 March 1952.

68. McLean, J. W. Screw pressure crown. Brit. D. J. 85:128 Sept. 17, 1948.

69. Tylman, S. D. Year book of dentistry, 1949. Chicago, Year Book Publishers, 1950, p. 79.

70. Stockton, R. K. Direct acrylic resin inlays. D. Digest 60:161 April 1954.

71. Sears, A. W. Hydrocolloid impression technique for inlays and fixed bridges. D. Digest 43:230 May 1937.

72. Thompson, M. J. Reversible hydrocolloid impression material: its treatment and use in operative and prosthetic dentistry. J.A.D.A. 39:708 Dec. 1949.

73. Grey, J. M. Evaluation of hydrocolloid inlay technic. J. Canad. D. A. 19:3 Jan. 1953.

74. Kendrick, Z. V., Jr. Sears hydrocolloid impression technic in restorative dentistry. J.A.D.A. 33:445 April 1946.

75. Hampson, E. L. Hydrocolloid impression technic for multiple inlays and bridgework. Brit. D. J. 88:240 May 5, 1950.

76. Buchmann, W. A. Use of hydrocolloids in inlay and bridge prosthesis. Fort. Rev. Chicago D. Soc. 16:7 Nov. 15, 1948.

77. Phillips, R. W.; Price, R. R., and Reinking, R. H. Use of alginate for indirect restorations. J.A.D.A. 46:393 April 1953.

78. Pfeiffer, K. R., and Jeffreys, F. E. Complete bridge technic utilizing the alginate hydrocolloids. J.A.D.A. 40:66 Jan. 1950.

79. Skinner, E. W., and Pomes, C. E. Alginate impression materials: technic for manipulation and criteria for selection. J.A.D.A. 35:295 Aug. 15, 1947.

80. Dwight, O. D. Copper plating of reversible hydrocolloid impressions. J. D. Res. 28:456 Oct. 1949.

81. Schwartz, M. The electroplating of the colloid impression materials. D. Items Interest 74:217 March; 74:346 April; 74:427 May 1952.

dies, the inability of the impressions to withstand storing, the difficulty in separating models and many other factors. Preliminary investigations indicate that the new synthetic rubber base impression materials approach the ideal for use as crown and bridge impression materials. Once again, however, only time and research can tell if they will find a place in the dentist's armamentarium.

CEMENTATION OF RESTORATIONS

The actual cementation of any restoration is not a simple process. The preparation of the restoration for cementation is of first importance. Since most difficulties are experienced with bridges, their cementation will be used to exemplify the difficulties encountered with all metallic restorations.

The bridge is first tried in the mouth without the pontics and is checked for fit, tension or spring,[82] contour of margins, contact points and occlusion. If one of the retainers does not appear to be accurate, possibly because of a change in position of the abutment, the bridge may be cemented temporarily to allow the abutment to realign itself. Temporary cement is never placed in the tooth that needs correction, for it will only cement the bridge in its improper position. After the metallic portion of the bridge has been checked and corrections made, the pontics are inserted into the backings and are waxed into position. The gingival portion of the pontics is then coated with a thin layer of pink disclosing wax, and the bridge is inserted in the mouth. After removal, points of pressure are noted on the pontics and are relieved. This procedure should be repeated until the pontics are just barely resting on the gingival tissues.

The inside of the retainers should be relieved to allow a thin cement layer that will reduce shock to the tooth and act as an insulator against heat and cold. The driving of snug inlays[83] should be avoided insofar as is possible; such inlays can be relieved by either of two methods. The first method[84] is to coat with wax the entire outer surface of the inlay and the cavosurface for a width of from 0.5 to 1 mm. and place in nitrohydrochloric acid for a period of from 5 to 30 minutes, depending on the amount of gold that must be relieved. The second method is to use disks and burs. Only after the retainers are relieved can the pontics be cemented to the backings. The entire bridge is then washed with liquid soap and water and dried with grain alcohol.

The abutments then are cleaned with pumice, thoroughly washed with a stream of warm water and dried with cotton and warm air. Alcohol should never be used prior to cementation for it dehydrates the tooth, removing the dentinal fluids, thus allowing the free acid of the cement to penetrate into the pulp. Silver nitrate may be applied to posterior teeth as an added precaution, and a thin layer of cavity varnish is applied over the exposed dentin and dried with warm air.

The mixing of the cement must be done on a temperature controlled slab so as to allow the greatest amount of powder to be incorporated into the liquid. Use of the slab lengthens the working time and shortens the time required for the final set of cements, thus yielding a warmer cement that is more tolerable to the tooth.[85] Many dentists avoid using the temperature slabs, but they are essential not only for the mixing of cements but also for silicates. The best temperature is 65 to 70° F. or just above the dew point of the slab. This temperature is obtained easily by immersing the slab in cold water or, if an air-conditioning unit

82. Simpson, R. L. Failures in crown and bridge prosthodontics. J.A.D.A. 47:154 Aug. 1953.

83. Gillett, H. W. Gold inlays by the indirect system. D. Items Interest 49:943 Dec. 1927.

84. Hollenback, G. M. A practical contribution to the standardization of the casting technique. Pacific D. Gazette 37:1 Jan. 1929.

85. Henschel, C. J. The effect of mixing surface temperature upon dental cementation. J.A.D.A. 30:1583 Oct. 1943.

is available, by cooling over the cold air duct.

The cement and liquid are now placed on the slab and the powder is divided into six equal parts. A minute amount of powder,[86] about the size of the head of a no. 3 round bur, is thoroughly incorporated into the liquid and allowed to remain for three minutes. The remaining cement is then incorporated into the liquid, one section about every 20 seconds, and the mix is spread over a large area to diffuse heat. The resultant mix is one sufficiently plastic to allow plenty of time for the cementing of any bridge or a number of inlays without danger of the cement beginning to set before the restorations are in place. Another method of obtaining a retarded cement is to incorporate one section of the cement in the liquid, spatulating it thoroughly for one full minute and then continuing the mix as before.

The inner surface of the retainers are first coated with the cement mix, for if the cement is inserted in the cavity first, the temperature of the tooth would hasten the setting.[87] The retainers then are completely filled and the bridge placed in the mouth and pressed into place with finger pressure. An automatic foil mallet or round burnisher and hand mallet may be used to force the restoration into position. Because of the steep planes of the lingual surface of many anterior teeth, a straight chisel may be used instead of a burnisher or automatic mallet. An inlay will rebound[86] under mallet force if it does not fit the cavity walls properly, or if air is trapped between the cavity walls and the inlay, or if the mallet force is not sufficient to break the surface tension of the cement.

The excess cement is removed with a finger or cotton moistened with alcohol and the margins are flushed with round burs. Rotating the bur from gold to tooth surface helps to finish the margins of the restoration, vibrates it further and removes excess cement. Fine sandpaper disks can then be used on the external and internal margins down to the gingival tissue. If this tissue had been packed properly with a temporary filling between appointments, the lateral gingival corner of the inlay, the most vulnerable part of any inlay, can be burnished with fine pointed diamond or carborundum stones. Caution should be used at this point to use only very fine stones, for rough ones may scratch the enamel unduly. The bridge is then held under pressure until the cement has completely set, and the excess cement is removed. The restoration is then checked for occlusion and is tested in all movements of the mandible so that eventual periodontal and pulpal irritations may be avoided.[88] Final polishing of the bridge should be delayed until a later appointment when wet pumice and whiting can be used to remove any scratches on the gold or tooth structure.

Porcelain jacket crowns are cemented in much the same manner as the bridge; however, common sense dictates that they cannot be burnished or malleted into place. Rotary motions of the crown also should be avoided as this sometimes causes cracks or complete breakage of the porcelain. Finger pressure or the use of a rubber eraser on the incisal edge usually is sufficient to break the surface tension of the cement and hold the crown in place until the final set. Abnormal stresses should be avoided with porcelain jacket crowns.[89] If lost vertical dimension must be restored or the occlusion corrected, work in the posterior section of the mouth must be completed first or the jacket will fail.[90]

86. Gates, M. A. Cementing inlays. J.A.D.A. 15:435 March 1928.

87. Nylander, V. T. Inlay technic. J.A.D.A. 11:827 Sept. 1924.

88. Tylman, S. D. Biologic concepts of fixed partial dentures. New York J. Den. 18:386 Dec. 1948.

89. Kleffenbach, A. O. Science, art and ceramic fundamentals involved in porcelain jacket crown prosthesis. Austral. J. Den. 55:88 April 1951.

90. Bastian, C. C. Construction of porcelain jacket crowns in close bite cases. Fort. Rev. Chicago D. Soc. 22:7 Oct. 1. 1951.

It is exceedingly irritating if a gold crown, either by itself or when it is used as a bridge retainer, is high in occlusion after cementation. This can indicate only one thing—that the crown is not completely down on the preparation.

Gold crowns, in order to give many years of service, must meet certain requirements. The teeth must be prepared so that the gingival border of the gold crown will extend slightly beneath the free border of the gingiva without injuring the delicate periodontal fibers.[91] Crowns that fit properly will not cause irritation or deepen pockets. The gingival margin of any gold crown, therefore, must fit as accurately as a gold inlay.[92] Another prerequisite is a minimum of 1.5 mm. of metal at the crest of the cusps and at least 1 mm. in the sulci and grooves[93] so as to allow for wear and strength. The only practical gold crown that would meet these requirements would be the all-cast type, or some modification of it.

As with the inlay, the principal reasons that a gold crown does not seat properly during cementation are that air is trapped between the walls of the preparation and the crown, the surface tension of the cement has not been overcome, too much hydraulic pressure[94] has developed, or too much cement has been trapped between the occlusal portion of the preparation and the crown. The chief reason usually is, however, that there is not enough room for the cement to escape, and the degree of difficulty in seating a restoration is in direct proportion to the distance cement has to travel from the innermost portion of the preparation to the closest margins of escape. Many methods have been developed to help the cement escape. A hole can be made in the occlusal or buccal surfaces of the crown which later can be filled with amalgam or gold foil.[95] The inside of the crown can be relieved with burs or stones or with nitrohydrochloric acid. Four grooves can be cut on the inside of the crown almost to the peripheral margin,[96] or the crown can be waxed up over a copper band matrix, then invested and cast. Finally the casting can be immersed in nitric acid for a few hours to dissolve the copper band.[97]

Many years of experience have proved the following technic to be most successful. The preparation and impressions are made in the usual way, and the master die and occlusion casts are prepared. Thick tinfoil is then adapted and swaged to the die, using tinners joints which can be reduced with a rubber wheel. Any good foil can be used, but that found with the regular dental x-rays is ideal both with regard to thickness as well as handling capacity. The crown is then completely waxed up and checked for occlusion and contact.

A razor blade or scalpel is used to remove 1 to 1.5 mm. of wax on the gingival aspect, and the foil is removed, exposing the master die. After the die has been lubricated, fresh wax is flowed around this area. It is advisable to make the wax somewhat thick around the gingival margin so as to insure casting (Fig. 2, left). The wax crown is then removed and the tinfoil is easily peeled from the inside. The crown then may be invested, cast and polished in the usual manner. The resulting all-cast crown (Fig. 2, center) fits the gingival portion of the tooth like an inlay and proper seating is assured. In addition, there is sufficient space to permit an easier flow of cement.

91. Waerhaug, J. Tissue reactions around artificial crowns. J. Periodont. 24:172 July 1953.

92. Mosteller, J. H. The relation between operative dentistry and periodontal disease. J.A.D.A. 47:6 July 1953.

93. Selberg, A. Cast gold crowns. J. Tennessee D. A. 29:21 Oct. 1949.

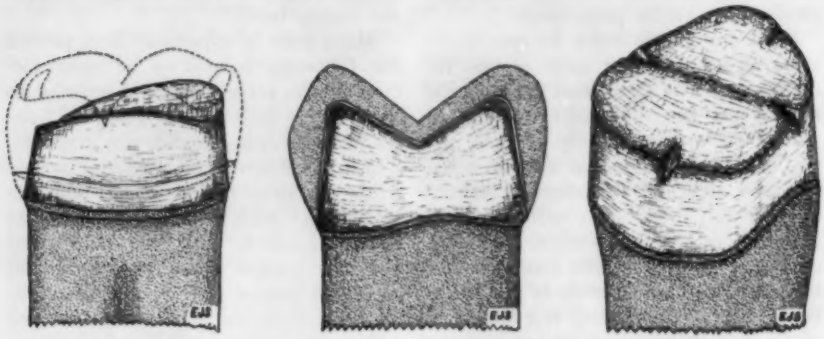
94. Hoffman, J. M. Common problems in the construction of the full cast crown. J.A.D.A. 48:272 March 1954.

95. Adler, P. The importance of the "marginal index" in cementation of metal and porcelain work. D. Items Interest 63:215 March 1941.

96. Tylman, S. D. Theory and practice of crown and bridge prosthesis, ed. 2. St. Louis, C. V. Mosby Co., 1947, p. 764.

97. Strum, J. Z. Technic for improved cast crown. New York D. J. 16:313 June-July 1950.

Fig. 2 • Left: After tinfoil matrix is adapted, crown is completely waxed up, and 1 to 1.5 mm. of wax at gingival margin and tinfoil are removed. After lubricating die, fresh wax is flowed around gingival margin, crown is removed, tinfoil peeled out, invested and cast. Center: Cross section of completed crown showing adequate cement space as well as inlay type fit and seat around gingival margin. Right: Sluiceways are made on preparation immediately prior to cementation of crown to allow excess cement to escape



Before the crown is cemented, however, four grooves (Fig. 2, right) are made on the preparation at the buccal, lingual, mesial and distal occlusal edge with a diamond stone or disk, and a sluiceway is added at the occlusal portion of the crown to allow cement to escape.

COLOR PROBLEM IN ESTHETICS

The production of color in any dental restoration is extremely complicated. Color can be mixed by two methods[98]—by the addition of light or by the subtraction of light. In the first method, if red, violet and green colored lights are added together, a white light is obtained. In the second, or subtractive method, pigments of crimson, blue and yellow are added to get black. This is the method used by artists, and the difference between the two methods lies in the ability of a pigment to subtract certain colors from white light by absorption, leaving the remainder to characterize the color of the object by reflection. This, then, is where color actually comes from.

Color itself, though, has three dimensions or properties.[99] The first is commonly referred to as hue and pertains to the description of the color qualities, as yellowish, grayish, reddish or greenish. Brilliance, the second property, classifies the color as to its lightness or darkness. The third property is saturation, which pertains to strength of the hue as, for example, in the amount of gray seen in two colors of similar brilliance.[100] The word "shade" or "shading" is often used, but in artists' parlance this really means that black has been added. Actually the word that should be used instead of shade is "hue," because the use of black is definitely out of order in dental colors.[101] When a color is selected, the brilliance of the hue must be considered first and then the saturation.

Normal tooth colors are usually those

98. Clark, E. B. The color problem in dentistry. D. Digest 37:646 Oct. 1931.

99. Clark, E. B. Selection of tooth color for the edentulous patient. J.A.D.A. 35:787 Dec. 1947.

100. Clark, E. B. The color problem in dentistry, 4th article. D. Digest 37:732 Nov. 1931.

101. Cross, K. K. Color: its principles and their application to prosthetic restorations. D. Digest 28:765 Dec. 1922.

reflected from the dentin through the transparent enamel.[102] Some controversy exists as to whether the dentin actually has color in itself, or whether it is the reflection of light against the dentinal tubules that is seen. One thing seems certain, however, and that is that the dental pulp does not exert a pink or red influence on the color. Any attempt to inject reds or pinks artificially in the matching of dental colors will almost always result in failure and should be avoided. Actually, there are some of the yellows that have either a reddish or a greenish tint, but these are far from common. The basic colors from normal dentin would appear to be yellow, brown, gray and white.

The selection of color should be based on the complexion tone of the patient which will fall into one of two groups, the yellow or the gray. The yellow group usually includes persons whose hair is blonde or red as well as many with dark hair and eyes. The red or yellow usually predominates in their complexion. The gray group ordinarily possesses dark hair and eyes with gray, olive or brown colors predominating in their complexions. If this basis is used as a starting point for color control, what follows should be fairly easy.

Naturally, the selection of color depends on many factors. First the base color should be selected with reference to the thickest portion of the tooth, and then the more transparent incisal or overlying portion is selected. To avoid some of the tricks played by daylight and artificial light, matching should be done in the middle morning or afternoon hours using the natural north light if possible. The patient's head should be turned from side to side so as to observe all possible light angles. The fact must always be kept in mind that an operator can easily become color fatigued, then most colors will appear to match. Other factors to be careful of are the background in the mouth, the color of patient's clothes, reflection of surrounding equipment and the natural ability of the dentist to match colors.

An operator is primarily interested in obtaining correct esthetics with the cementation. Since the plastic resins, porcelain jackets, cementation of facings and inlays all have their individual problems, they will be discussed one at a time.

The color possibilities of the resins are unlimited, regardless of whether the direct or indirect methods are used or whether direct filling or heat-cured resins are used. Their opacity can be controlled easily, and their ability to blend with other colors in the mouth is unsurpassed. The resins are now manufactured in such a wide range of colors that it usually is not necessary to change them. However, if it is necessary, zinc oxide or titanium oxide can be used to change the opacity. To color the resins, cadmium red, brown ochre, yellow ochre, vermilion or "Royal Blue" pigments may be used.[86] In short, color in dental resins can be controlled by using the same inorganic pigment that is used in dental porcelains.[103, 104] Many times mineral stains have been used in porcelain work; these stains can be used effectively with resins, but care must be exercised to mix the stains completely or the colors may streak.

A technic will be described later which can be used if resins are to be cemented without a layer of gold between them and the tooth. If resins are placed over gold, a masking material should be used to prevent the distortion of color by the gold or other metal used. This is especially necessary where thin layers of plastic resin are used. An ivory mask is used for the body in light colors, changing to a buff, light yellow and dark yellow for the darker ones. Behind the incisal por-

102. Argue, J. E. The problem of tooth color. J.A.D.A. & D. Cosmos 24:1341 Aug. 1937.

103. Nelson, C. A. Control of color in dental plastics. J.A.D.A. 29:648 April 1942.

104. Rich, V. G. Pigmentation of dental plastics. J.A.D.A. 31:249 Feb. 1944.

tion, a faint bluish gray should be used to simulate the transparency of the incisal aspect. After the masking material has been cured by heat from a Bunsen flame or lamp, the main body of the plastic resin can be applied, using either the heat-cured or the direct filling types. Characterization such as simulated fillings, hairline checks and other changes can be accomplished by using colored Mikado pencils immediately below the outside layer of resin.[105]

At the time gold is being cemented in a tooth, caution should be exercised so that the cement used does not "show through." It is better to test the color of cement before cementation by incorporating it with glycerine. Water is a poor vehicle for testing dental cements for it makes them appear much too light, especially the darker colors. Plain glycerine is also best to test cements that are to be used in cementing porcelain facings to gold or platinum colored backings. The latter, however, should be avoided unless a decided grayish color is necessary at the incisal tip. The body of a facing is seldom affected by platinum or stainless backings, but the thin incisal portion of the facing reflects the blue-gray of the backing in the cemented restoration.

The cementation of porcelain jacket crowns is the final test of an operator's knowledge of color and dental cements. Once again, glycerine should be used as a testing solution. An exception to this is when eugenol is used with the cement liquid to protect sensitive or radical preparations. The most acceptable liquid would be one drop of eugenol to every seven drops of cement liquid. The presence of the eugenol tends to make the cement more yellow, and this should be compensated for in the testing solution by adding one drop of eugenol to every seven drops of glycerine.

Dental cements also can be colored by using the mineral stains. The most commonly used are oxid of zinc (lemon yellow), oxid of silver (yellow), oxid uranium (greenish yellow), oxid of gold (bright rose-red), purple of cassius which is the double oxid of gold and tin (purple-red), and sponge platinum and filings (grayish blue). It is much easier to attain esthetic perfection through the use of mineral stains than it is by trying to match colors through the addition of many different cements.

Probably the most nearly neutral cement is a mixture of equal parts of platinum and ivory. This is an acceptable mixture and can be used in most instances where the porcelain matches the natural teeth. After a test has been made with glycerine, the color of mineral stain needed to correct the cement can be ascertained. These stains come in white, light and dark gray, black, blue, yellow, brown and red. As has been mentioned before, red and black should be avoided. Blue, when mixed with browns and ivory, sometimes produces a greenish tint and therefore should be used with caution. The addition of white will brighten any color. Yellow will also brighten any color, but when mixed with dark gray produces a mustardlike mix. Brown can be used to darken any color of cement but should be used sparingly. The grays are used primarily to tone down or saturate a color. The best sequence, therefore, would be to determine and obtain the hue first, say yellowish, then brighten it with white or yellow or darken it with brown. Finally, the color can be saturated with gray if indicated.

SUMMARY

1. Proper diagnosis and attention to mechanical as well as periodontal requirements are essential to good crown and bridgework. Reliance on cement alone will only lead to eventual failure.

2. Dental cements account for many

105. Silverman, S. M. Staining of acrylic jacket crowns and pontics. D. Digest 51:570 Oct. 1945.

pulp deaths, and the protection of the dentin as well as the dental pulp is absolutely necessary.

3. The present methods of cavity sterilization do more harm than good. The future of the sterilization of cavities will depend on the ability to incorporate antibiotics in dental cements and filling materials.

4. The zinc phosphate cements are the agent of choice for most cementation purposes, but the plastic cements would appear to be superior in some respects.

5. Temperature glass slabs are necessary for proper cement manipulation, whether they are silicates or zinc phosphate. Retarded cements are also essential for proper cementation.

6. The gold crown remains the biggest problem in cementation in crown and bridgework. A technic has been developed that will overcome this.

7. Inorganic mineral pigments or stains may be used to control colors in plastic resins, porcelains or dental cements. The theory of color should be understood, and a correlation made between esthetics and cementation in crown and bridge procedures.

1911 Central Street

Fixed splint and bridge assembly

Max B. Winslow, D.D.S., Detroit

Periodontal disease causes destruction of alveolar bone and periodontal membrane fibers and frequently leaves teeth inadequately supported. Pressures on the teeth which are transmitted to the attachment apparatus during mastication, swallowing and bruxism cause further damage to the weakened supporting structures because of increased osteoclastic activity.[1] The resulting resorption of bone causes an increase in the length of the clinical crowns and a decrease in the length of the clinical roots of involved teeth, so the periodontium is less able to withstand the increased stresses and torques to which it is subjected.

Splinting of teeth helps to lessen or prevent damage to the periodontal structures[2] by restricting movement of mobile teeth. This restriction of movement reduces the stimulation of osteoclasts and allows repair of periodontal membrane fibers to take place.

Apposition of bone occurs by osteoblastic activity,[3] and fibers of the periodontal membrane become reattached to cementum and lamina dura. It must be understood that other methods of periodontal treatment such as thorough removal of accretions and diseased crevicular epithelium, planing and smoothing

Associate attending dentist and head of section of periodontics, Sinai Hospital.

1. Weinmann, J. P., and Sicher, H. Bone and bones. St. Louis, C. V. Mosby Co., 1947, p. 121-122.

2. Beube, F. E. Periodontology: diagnosis and treatment. New York, Macmillan Co., 1953, p. 453-456.

3. Weinmann, J. P., and Sicher, H. Bone and bones. St. Louis, C. V. Mosby Co., 1947, p. 43.

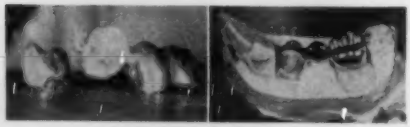


Fig. 1 • Broken stress assembly showing deep and sharply dovetailed stress lock

of cementum, occlusal balancing, education in proper dietary requirements, eradication of periodontal pockets, elimination of complicating systemic factors and instruction in oral hygiene are essential to complete therapy.

Fixed splinting, through the use of connected inlays or crowns, has proved to be the procedure of choice because it provides for the fixation of teeth necessary to the elimination or diminution of excessive strains or torques.

INDICATIONS FOR SPLINTING

Fixed splinting of teeth is indicated (1) for clinically mobile teeth; (2) for instances in which there has been appreciable bone loss, and (3) for multiple abutments in fixed bridgework.[4]

In evaluating the indications for fixed splinting, it is advisable to make roentgenographic, clinical and occlusal surveys.

A roentgenographic analysis should be made of the length of the anatomic crowns and roots, the size and shape of the roots, the amount and distribution of bone loss, the width of the periodontal membrane space and the size and shape of the pulp chamber. Absence of pathosis at the apexes of the teeth must be determined.

It is important to evaluate clinically the length of the clinical crowns and roots, the relative mobility of teeth, the position and alignment of teeth, the location and geography of periodontal pockets, the number of teeth to be splinted and the vitality of teeth. The occlusion should be studied carefully. Selective grinding should be done to correct acquired centric relations and to balance occlusal forces in functional movements.[5-7]

Full or three-quarter crowns should be used in fixed splinting. Two or three surface inlays may not be sufficient to fulfill the requirements of rigidity of individual castings. Soldered joints between castings should be used whenever possible. If a broken stress assembly is necessary, the stress lock should be constructed as long, as deep and as sharply dovetailed as possible (Fig. 1).

It is better to oversplint than to undersplint. Enough teeth should be included in the prosthesis to make certain that loose teeth are immobilized and that no teeth included in the splint are subjected to too much load.

ASSEMBLING FIXED SPLINTS

The assembling of fixed splints and bridgework is complicated by the difficulty of maintaining the fit of the individual castings after assembly. This difficulty arises from the dimensional changes in the refractory model during heating. Frequently, precisely fitting abutment and splint castings will not go into place readily after soldering. It is necessary, therefore, to allow orthodontic movement of teeth to take place before final cementation of the prosthesis, or to reassemble the casting and solder one joint at a time with reassembly after each soldering operation.[8]

4. Glickman, Irving. Clinical periodontology; the periodontium in health and disease. Philadelphia, W. B. Saunders Co., 1953, p. 964-965.

5. Schuyler, C. H. Fundamental principles in the correction of occlusal disharmony, natural and artificial. J.A.D.A. 22:1193 July 1935.

6. Shore, N. A. Equilibration of the occlusion of natural dentition. J.A.D.A. 44:414 April 1952.

7. Cross, W. G. Selective grinding as a means of prevention and treatment of periodontal disease. D. Practitioner 2:300 June 1952.

8. Tylman, S. D. Theory and practice of crown and bridgework. St. Louis, C. V. Mosby Co., 1940, p. 655.

TECHNIC

A technic which permits soldering without investing in a refractory material has proved helpful. The sprues that are left attached to the individual inlays, crowns and pontics are welded together. After welding, the work is removed from the model and soldered in the Bunsen burner. The sprueing of the waxed patterns is done so that the sprues converge (Fig. 2). If the thickest part of the pattern does not happen to be at the lingual, buccal or labial surface, and the sprueing must be done at another surface of the pattern, 12 or 14 gauge round wax is used to form a vent or additional sprue at the desired area.

After the patterns are invested and burned out and the castings made, the restorations are assembled on the model and the articulation is checked. If the sprues do not touch, they are bent together with three-pronged bar-bending pliers. The sprues are then luted together with sticky wax and the castings are locked in position by a plaster matrix poured on the side opposite to the sprues.

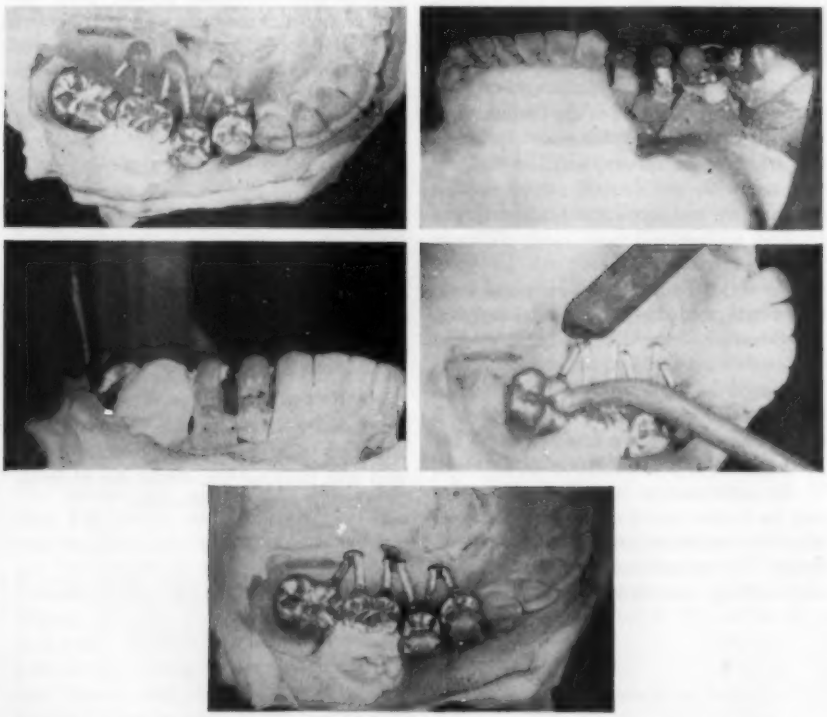


Fig. 2 • Above left: Occlusal view showing convergence of sprues or vents to be welded. Above right: Lingual view showing sprues or vents luted with sticky wax. Center left: Buccal view showing plaster matrix to hold pontic in place during assembly. Center right: Model tilted to bring sprue ends in upright position. Note cold electrode is placed broadside across castings and hot electrode is applied to sprue ends. Below: Sprues after welding

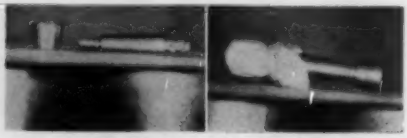


Fig. 3 • Threaded dowel pins and nut used in hydrocolloid procedure

The plaster matrix is necessary only when pontics are involved.

The sticky wax is removed by heating in the Bunsen burner, and then the sprues are welded. The model is placed in a spring clamp model vise and tilted so that the sprue ends are in an upright position. The sprue ends are stoned off and lightly fluxed with paste soldering flux. The cold or metal electrode is placed broadside across the sprues close to the castings. The hot or carbon electrode is dipped in water and applied to the ends of the sprues, and the welding is done with the control setting at the medium or medium-high positions. The control setting will vary with different welding machines.

The welded castings are removed from the model, and the joints are soldered in the Bunsen burner. The solder should be the one indicated for the type of gold alloy used for the castings. For the hard or Type C alloy, .615 fine solder is used. The castings are fitted back on the model, and the articulation is checked. If the articulation is faulty, the solder may be melted and the castings resoldered after the necessary corrections have been made. The sprues are then cut off and the castings are finished in the usual manner. This procedure allows the teeth to remain in their original relationship to each other, and the assembled casting will go into place as readily as the individual restorations did before soldering.

If the hydrocolloid impression technic is used, the entire procedure is simplified. Usually only two visits by the patient are needed.[9] The hydrocolloid technic permits, in addition, a useful method of model pouring. The first pour is done after shimming with .002 inch thick stainless steel band material. The dowel pins used are larger than the standard ones and are threaded at the small end. A threaded nut is fastened to the dowel pin so that after the second pour the individual dies may not only be removed for easier access, but they may be screwed to place at any time. This assures the accurate seating of dies and obviates the necessity of using two models (Fig. 3).

COMMENT

The technic described is particularly helpful in instances when fixed splinting is indicated. If splinting is required, it usually means that the supporting structures of the teeth have lost some of their integrity. The structures cannot tolerate increased pressure and torques from incorrectly fitting castings. The procedure described will aid in the fabrication of splinting and fixed bridge restorations and will prolong the useful life of teeth.

19457 Livernois Avenue

9. Thompson, M. J. Standardized indirect technic for reversible hydrocolloid. J.A.D.A. 46:1 Jan. 1953.

Man's Limited Knowledge • It is a curious fact that, having minds tending to the infinite, with imaginations unlimited by time and space, the limits of our exact knowledge are very small indeed. *Henry A. Rowland.*

Clinical observations on use of mephenesin in cerebral palsy patients

Manuel M. Album, D.D.S., Philadelphia

A preliminary report[1] told of the beneficial effect of the use of mephenesin (Tolserol) in 35 children with cerebral palsy who were under dental care. The relaxation obtained with the drug made it possible to treat these patients in a more normal manner. It was concluded that mephenesin held promise as a tool in dentistry, and that more extensive clinical investigation seemed called for.

The following report presents observations made when mephenesin was given to 109 dental patients suffering from cerebral palsy. In addition, 97 normal individuals received mephenesin prior to dental operations. Certain control methods not employed in the previous study were instituted.

GENERAL CONSIDERATIONS

The dental care of cerebral palsy children has always been difficult.[2,3] These persons, particularly the ones who have not had speech therapy, have poor control over the muscles of the mouth or throat. Usually they are apprehensive and many are unable to keep the jaw in position for a long period of time. They can close it with the strength of a vise, however, thus making it difficult as well as hazardous for the dentist to carry out any work. In addition, many are unable to swallow properly. For these reasons, dentists have always hesitated to perform work on cerebral palsy patients, since they fear they might injure the patient as well as themselves. Nevertheless, it has been shown that, if certain special methods were used, dental treatment can be given to cerebral palsy patients with increased safety. During the past seven years, over 1,500 patients have been treated in private practice and at the clinic of the Philadelphia Society for Crippled Children and Adults. The use of mephenesin made it possible to treat many of the patients more comfortably and safely. The experience has been, however, that even with mephenesin it was not possible to relax all patients sufficiently so that hospitalization and the use of general anesthesia could be avoided. Approximately 10 per cent of the patients fall into this latter category.

PHARMACOLOGY OF MEPHENESIN

Mephenesin is 3-ortho-toloxy-1, 2-propanediol, an alpha substituted ether of glycerol. It was introduced clinically in 1948 and was found to be useful as a

Chief, dental service, Philadelphia Society for Crippled Children and Adults.

1. Album, M. M. Dental use of mephenesin in cerebral palsy patients: a preliminary report. J.A.D.A. 45:165 Aug. 1952.

2. Album, M. M. Why dentistry in cerebral palsy? J. Den. Children 17:11 2nd quart. 1950.

3. Album, M. M. Dentistry—an asset to the cerebral palsied child. D. Digest 52:258 June 1950.

relaxant in certain neuromuscular disorders and in the treatment of acute muscle spasm. Many reports on its clinical use and its pharmacology have been published.[4-11] The drug must be used in doses sufficient to produce a therapeutic effect. The absence of toxicity with the doses employed has been gratifying.

METHODS AND DOSAGE

The cerebral palsy patients in the present study, which was carried out over one year, had all types of the disease (spastic, athetoid, ataxia, rigidity). The patients ranged in age from 2 to 34 years. They were seen, on the average, four or five times and were given varying doses of mephenesin. The patients' weight ranged from 20 pounds to 135 pounds. For purposes of comparison, certain patients were given no medication, and in a number of instances, they were given placebos.

The placebo used in this study was identical to the elixir in color and taste but it did not contain mephenesin. There was no evidence of muscle relaxation and no loss of apprehension on the part of the patients who were given the placebos.

The criteria employed for judging the effect of the mephenesin was based on the relaxation of the masseter muscle, the diminishing of the extraneous movements, the feeling of euphoria and the reduction of anxiety.

The dosage mentioned in the preliminary report was 0.5 Gm. of mephenesin for every 50 pounds of body weight. In the present study the dosage was increased in most instances to 1 Gm. per 50 pounds of body weight. This higher dose proved more effective and the patients tolerated it without any serious side effects. Dosage for normal adult patients was between 2 and 4.75 Gm. The age range of the normal dental patients was from 2 to 62 years.

Mephenesin was given in the form of a 10 per cent elixir. This appeared more useful and its action was somewhat faster than when given in tablet or capsule form. Also, it is the most suitable preparation for cerebral palsy patients since they generally find it exceedingly difficult to swallow solids.

ONSET AND DURATION OF EFFECT

Relaxation was observed about 20 to 25 minutes after the mephenesin elixir was administered and lasted approximately 30 to 45 minutes. The length and degree of relaxation was dependent on the amount of drug administered. The feeling of euphoria and well-being which developed tapered off during the last 15 minutes and then disappeared completely. With the action of the drug completed, the patients once again became tense and apprehensive. Best results were obtained when dental work was started 20 to 30 minutes after the administration of the drug.

The effects after repeated administration were essentially the same, and on subsequent visits the patients responded in the same manner as when first seen. None of the patients suffered any serious discomfort after leaving the office or clinic.

4. Berger, F. M., and Schwartz, R. P. Oral "myanesin" in treatment of spastic and hyperkinetic disorders. J.A.M.A. 137:772 June 26, 1948.

5. Henneman, E.; Kaplan, A., and Unna, K. A neuropharmacological study on the effects of myanesin (Tolserol) on motor systems. J. Pharmacol. & Exper. Therap. 97:331 Nov. 1949.

6. Stephen, C. R., and Chandy, J. Clinical and experimental studies with myanesin. Canad. M.A.J. 57:463 Nov. 1947.

7. Gammon, G. D., and Churchill, J. A. Effects of myanesin upon the central nervous system. Am. J. M. Sc. 217:143 Feb. 1949.

8. Schlesinger, E. B.; Drew, A. L., and Wood, B. Clinical studies in the use of myanesin. Am. J. Med. 4:365 March 1948.

9. Herman, I. F., and Smith, R. T. 3-O-toloxy 1, 2-propanediol in the treatment of rheumatic diseases. Journal-Lancet 71:271 July 1951.

10. Schlesinger, E. B., and Stinchfield, F. E. Use of muscle relaxants as an aid in the diagnosis and therapy of acute low-back disorders. J. Bone & Joint Surg. 33A:480 April 1951.

11. Frantz, C. H. Orally given mephenesin in infantile cerebral palsy. J.A.M.A. 143:424 June 3, 1950.

CLINICAL OBSERVATIONS OF CEREBRAL PALSY PATIENTS

Mephenesin (Tolserol) produced a feeling of euphoria and relaxation in most of the patients (see table). Nervousness or apprehension diminished or disappeared and in most instances they became relaxed and better dental patients. Those persons who had been comparatively good patients without medication became slightly more cooperative under the influence of the drug. A few could not tolerate the drug. When mephenesin was administered to these, a mucous discharge accompanied by spells of coughing was observed (this never occurred in normal individuals who were given mephenesin). In all, 15 of the 109 cerebral palsy patients treated showed poor relaxation. Eight of them had to be hospitalized in order to have their entire mouths restored under general anesthesia.

The response to mephenesin varied in different individuals. Generally speaking, it appeared that the patients of the athetoid type responded slightly better than those of the spastic type.

The placebos were ineffective in all instances; the reactions of the patients who received them were the same as the reactions of the patients who had had no medication.

OBSERVATIONS OF NORMAL ADULT PATIENTS

In the 97 normal adult patients, when mephenesin was administered, relaxation was excellent in 75, good in 9, and fair in 13. In 11 of these patients who were observed, the ensuing relaxation was a distinct advantage both to the patient and the dentist. The reconstruction of the mouth was considerably facilitated by the use of the drug. These observations are in agreement with those of Eskin[12] who noted a beneficial action in 49 out of 57 normal adult patients who were given mephenesin prior to oral surgery.

Table • Effect of mephenesin in treatment of cerebral palsy

Type of cerebral palsy	Degree of relaxation				Could not tolerate drug
	Excellent	Good	Fair	Poor	
Spastic	26	9	6	10	3
Brachial	2				
Rigidity	6	4	1		
Athetoid	11	3		2	
Flaccidity		1			
Ataxia	1	1			
Unknown types	12	5	1	3	
Narcoleptic	1				
Postencephalitis			1		

OTHER OBSERVATIONS ON ACTION OF MEPHENESIN

Topical Anesthetic Effect • When mephenesin is given in the elixir form, it has an effective anesthetic action on the mucous membranes of the mouth and throat. This topical anesthesia is not observed when the drug is swallowed in tablet or capsule form. Although the action is transient, it can be of considerable assistance to the dentist; for instance, when given to a patient prior to the taking of an impression of the maxillary arch, the local anesthetic effect temporarily eliminates the gagging sensation which usually is experienced. Patients who gagged when intraoral roentgenograms were taken without medication did not do so when given mephenesin elixir. This topical anesthesia also could be useful when new dentures are to be inserted.

Relaxation of Taut Muscles • When mephenesin was used with edentulous patients, intraoral registrations were easier to record and the tracings proved

12. Eskin, L. C. Tolserol for sedation prior to oral surgery. Oral. Surg., Oral Med. & Oral Path. 4:1246 Oct. 1951.

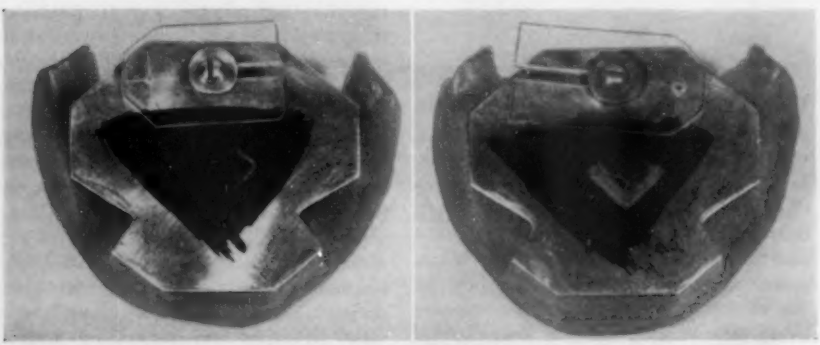
more satisfactory. The illustration, left, shows the stylus tracing made in the mouth of a confirmed pipe smoker whose musculature in the temporomandibular region was extremely taut and tense because of holding the pipe constantly in his mouth. Mephenesin was not given and, as can be seen, the centric registration is in an excentric position. The illustration on the right is the tracing made of the same patient 35 minutes after he had been given the mephenesin elixir. The muscles and ligaments were completely relaxed and a true centric registration was obtained.

Decrease of Salivary Flow • Another interesting observation on the action of mephenesin which may prove useful in dental operations is the dryness of the mouth produced by the drug. There is definite evidence that the administration of mephenesin elixir decreases temporarily the flow of saliva. This decrease in salivation differs from xerostomia; it occurs 9 to 10 minutes after administration of the elixir and lasts approximately 15 minutes. After that, salivation tends to return to normal. This pharmacologic attribute of mephenesin should be useful to the dentist since it permits him to have a fairly clear field of operation when inserting fillings and cementing bridgework.

Untoward Reactions • In general, the taste of the medication is found to be unpleasant and is disliked by most children. In spite of the rather large amounts necessary for a good effect, however, side reactions were rare. Parents of children were questioned carefully regarding nausea and vomiting. Of the 109 cerebral palsy patients treated, five experienced vomiting and four felt sick to their stomachs. The impression was gained that the weight, diet and nervous temperament of the child were partly responsible in those who were inclined to vomit. Data were kept regarding nausea in 11 of the normal adult patients; only one of these experienced slight nausea. This was of a transient nature and did not prevent the dentist from proceeding with his work.

Several patients who were given large doses experienced a light-headed feeling or sensation of fainting. This effect could be attributed to temporary emotional factors since on subsequent visits, when the same dose was administered, such a sensation did not recur.

In the preliminary report it was stated



Left: Stylus tracing made in mouth of patient who is confirmed pipe smoker. Centric registration is in excentric position. Right: True centric registration obtained 35 minutes after patient had been given elixir of mephenesin

that mephenesin might be contraindicated in patients under the influence of a barbiturate. It had been feared that such simultaneous use might result in severe reactions. This was not substantiated in the present series. Many of the cerebral palsy patients in the present group were on a maintenance barbiturate therapy of 0.5 grain three times a day at the time of the administration of mephenesin prior to dental procedures. Mephenesin at an average dose level of 0.5 Gm. per 50 pounds of body weight did not cause unexpectedly severe sedative effects.[13, 14]

Mephenesin is now being produced in a carbamate suspension which appears to be more agreeable in taste than the elixir and the muscular reactions seem to be somewhat faster. Preliminary studies appear encouraging, but further investigation is necessary before its use can be evaluated.

SUMMARY AND CONCLUSIONS

Mephenesin was used successfully prior to dental operations in 109 cerebral palsy patients. The study extended over a period of one year. The relaxation achieved in these patients who ordinarily are difficult to treat resulted in less apprehension and greater cooperation. With the drug, the patients experienced a feeling of euphoria and well-being. Ninety-seven normal adult patients were given mephenesin for relaxation prior to carrying out of dental work. Most patients were treated repeatedly (average 4 to 5 times). For the purpose of comparison, medication was withheld or placebos substituted in many instances.

Premedication with mephenesin has distinct advantages both for the patient and the dentist. This is true for patients with cerebral palsy as well as for normal adult persons undergoing dental treatment. The patients are more comfortable and the dentist's work is made easier. Operating time can be extended when mephenesin has been given to patients otherwise difficult to treat. Poor relaxation was observed in only 15 of the 109 cerebral palsy patients.

Mephenesin is most useful when administered in the elixir form since it acts more promptly; it is preferable to tablet or capsule form for the cerebral palsy patient. The onset of action occurs 20 to 25 minutes after administration of the drug and the effect lasts for about 30 to 45 minutes. Side reactions rarely occur. In a few individuals nausea and vomiting occur if the patient has been given a large dose.

The relaxant effect of mephenesin is of use when intraoral tracings of edentulous patients must be taken. Muscles and ligaments of the temporomandibular region are relaxed and true intraoral readings can be obtained.

The dryness of the mouth or decrease in salivary flow temporarily produced by the mephenesin may be a useful tool for the dentist since a clearer field can be obtained for operation. This will facilitate the insertion of fillings and the cementing of bridgework.

Another pharmacologic attribute of the drug is its local anesthetic effect. This was observed only with the elixir of mephenesin. It temporarily eliminated the gagging sensation usually experienced by the patient when impressions are taken or intraoral roentgenograms made, or when new dentures are inserted.

These aspects of the action of the drug should be investigated further.

1930 Chestnut Street

13. Chance, Burton, Jr. Personal communication.
14. Console, A. Dale. Personal communication.

A revision of American Dental Association specification no. 3 for dental impression compound

John W. Stanford, B.S.; George C. Paffenbarger,* D.D.S., and W. T. Sweeney,† A.B., Washington, D.C.*

The American Dental Association revises its specifications for dental materials whenever new or improved test methods and materials become available. To promote these revisions, the Council on Dental Research of the American Dental Association seeks the help of the Dental Materials Group of the International Association for Dental Research. The aid given by the Specifications Committee of this Group is reflected in the following current revision of American Dental Association Specification No. 3 for Dental Impression Compound and in the background work involved in the revision.

INTRODUCTION

Since 1931 when the American Dental Association specification for impression compound[1] was first formulated, there have been no significant changes in the composition of the compounds. The first revision[2] of the specification and this, the second revision, were occasioned primarily by refinements in the test procedure for determining flow. In fact, with the exception of the requirement for flow, the detail requirements of the specification remain unchanged. The format of the specification has been changed to conform more nearly to the form[3] for federal specifications.

When products on the List of Certified Dental Materials[4] are surveyed for compliance with the respective specifications and are found not to comply, an exchange of test data is made between the Dental Research Section at the National Bureau of Standards and the particular manufacturer. Such was the case with one manufacturer when impression compounds were retested. The exchange of data showed that differences existed between results obtained at the National Bureau of Standards and those obtained in the manufacturer's laboratory. These differences were thought to be due to one or more of the following factors: (1)

The publication of this revision was authorized by the National Bureau of Standards and the Council on Dental Research of the American Dental Association. The revision will be presented to the Board of Trustees of the American Dental Association at its September 1955 meeting; if approved, it will become effective July 1, 1956.

Statistical analysis performed by Mr. John Mandel, Testing and Specifications Section, National Bureau of Standards.

*Research associate, National Bureau of Standards Fellowship Division of the Council on Dental Research of the American Dental Association.

†Chief, dental research section, National Bureau of Standards.

1. Taylor, N. O.; Sweeney, W. T., and Paffenbarger, G. C. A specification for dental impression compound. J.A.D.A. 18:53 Jan. 1931.

2. Sweeney, W. T., and Beall, John R. American Dental Association specification no. 3 for dental impression compounds. First revision 1939. J.A.D.A. 27:713 May 1940.

3. Outline of form and instructions for the preparation of federal specifications (21 October 1947). Washington, D.C., Superintendent of Documents, U.S. Government Printing Office.

4. List of certified dental materials revised to December 15, 1954. J.A.D.A. 50:199 Feb. 1955.

Table 1 • Plan for exchanging data on impression compounds

Source of Material	Specimens made by	Specimens tested by	Result*
From the manufacturer	Mfr.	Mfr.	A
		NBS	B
	NBS	Mfr.	C
		NBS	D
Obtained on the open market by the A.D.A. Research Fellowship at the National Bureau of Standards	Mfr.	Mfr.	E
		NBS	F
	NBS	Mfr.	G
		NBS	H

*The value reported for each of the results is the average of two specimens as required by the specification.

differences in lots or batches of compound; (2) differences in methods of preparing specimens, and (3) differences in test procedures.

A data exchange program was carried out between the National Bureau of Standards and three manufacturers[5] to determine whether any one of the foregoing factors was mainly responsible for the observed differences. Also an independent investigation of the effect of variations in the preparation of specimens and in test procedures was made in the Dental Research Section at the National Bureau of Standards.

EXPERIMENTAL PROCEDURE AND RESULTS

Exchange Program • The data exchange program was set up as outlined in Table 1. For Result A the impression compound was supplied by the manufacturer, and the specimens were prepared and tested by him. Result A differed from Result B only in that Result B was obtained from tests in the laboratories of the National Bureau of Standards. Therefore, any difference between Results A and B should seemingly be caused by the test procedure. Likewise, Result A should differ from Result C and Result B should differ from Result D only because of differences in preparation of the specimens. The entire test procedure was duplicated on a sample of the impression compound of the same manufacturer obtained in the open market (Results E, F, G and H in Table 1).

The results obtained by following the outline in Table 1 with three manufacturers, X, Y and Z, are shown in Tables 2 through 5. In the case of manufacturer Z, the upper half of the outlined plan (Table 1) or Results A through D were obtained on a different lot of material than that available at the National Bureau of Standards. These results appear in Table 3. Manufacturer Y also did not have the same lot available for testing. The greatest difference in flow results between laboratories appeared in this part of the exchange program, the data of which are in Table 4. An additional exchange of specimens and data was made with manufacturer Y for Results A through D; however in this case, revised methods for preparing and testing the flow specimens were used. These data are given in Table 5.

A statistical analysis was made for the data of Table 2 (with the exception of those obtained at 45°C., for which the results were not complete) and for the

5. Mizzy, Inc., The Ransom & Randolph Co., The S.S. White Dental Manufacturing Co.

Table 2 • Data exchanged on impression compound with Manufacturer X

Result	Per cent flow at 37°C. (98.6°F.)	Per cent flow at 40°C. (104°F.)	Per cent flow at 45°C. (113°F.)
A	1.9	30.4	. . .
B	2.2	24.0	93.8
C	3.3	26.4	90.7
D	3.2	30.6	95.6
E	3.4	25.4	91.7
F	3.8	30.4	95.7
G	2.7	16.2	90.7
H	1.9	19.0	93.3
Average	2.8	25.3	93.1

Table 3 • Data exchanged on impression compound with Manufacturer Z

Result		Per cent flow at 37°C. (98.6°F.)	Per cent flow at 40°C. (104°F.)	Per cent flow at 45°C. (113°F.)
A	*	3.2	29.4	86.1
B	*	3.6	33.0	95.8
C	*	2.1	23.5	89.2
D	*	3.2	30.0	94.7
Average		3.0	29.0	91.4
E	†	0.6	7.8	86.4
F	†	1.2	14.2	92.6
G	†	0.8	8.2	88.2
H	†	0.6	8.8	91.5
Average		0.8	9.8	89.7

*Data exchanged with Manufacturer Z on impression compound furnished by him and not the same lot or batch as reported in Results E through H.
†Data exchanged with Manufacturer Z on impression compound obtained on open market for survey.

data of Table 3. Furthermore, the test error was evaluated from the agreement between measurements made in duplicate by the National Bureau of Standards. The values obtained for the standard deviation of test error are as follows:

For measurements made at 37°C., standard deviation = 0.3

For measurements made at 40°C., standard deviation = 1.9

For measurements made at 45°C., standard deviation = 0.3

When compared to these test errors, most of the differences observed in the tables are significant. In most instances, however, the variations cannot be attributed to any single variable. In the exchange data with Manufacturer X, no pattern is evident in regard to the contribution of source, specimen preparation, or test to the scatter of the data. In the exchange data with Manufacturer Z, the values obtained at 37°C. and at 40°C. show conclusive evidence of the difference between the batch furnished by the manufacturer and that secured by the National Bureau of Standards. The data obtained at 45°C., however, failed to show this difference.

In the exchange data with Manufacturer Z, measurements made by the National Bureau of Standards at 40°C. and at 45°C. yielded significantly higher values than those resulting from measurements made by the manufacturer on corresponding specimens. In the case of measurements made at 37°C., the same pattern is observed but the effect is not sufficiently large to become statistically significant. There is some evidence, which is not conclusive, however, that the specimens prepared by Manufacturer Z tended to yield higher values at 40°C. than those prepared by the National Bureau of Standards.

No statistical analysis was made for the exchange data with Manufacturer Y because of the change of procedure which affected half of the values obtained at each of the three temperatures.

The foregoing results indicate that the current specification procedure can detect variability among batches of compound from the same manufacturer. On the other hand, the results indicate that both the specimen preparation procedure and the test procedure vary from one laboratory to another. Therefore, it is desirable to describe these procedures more specifically in order to minimize differences between laboratories. In section 4.3.1.1 of the proposed revision of the specification (which follows), detailed directions for heating the compound, forming the specimens, and removing the specimens from the mold have been included.

Table 4 • Data exchanged with Manufacturer Y on impression compound obtained on the open market

Result	Per cent flow at 37°C. (98.6°F.)	Per cent flow at 40°C. (104°F.)	Per cent flow at 45°C. (113°F.)
E	2.1	44.0	87.2
F	3.2	34.7	90.4
G	1.0	21.0	87.0
H	4.6	55.2	96.0
Average	2.7	38.7	90.2

Investigation of Test Procedures • The most important factors in the flow test procedure appear to be: (1) the age of the specimen at the time of testing; (2) slight temperature variations at the critical 40.0°C. (104.0°F.) flow temperature; and (3) the chilling of the top of the specimen by the metal platen of the apparatus.

The effect of the age of a specimen on its flow at 37.0°C. (98.6°F.) under the conditions of test (4.3.1.2) is shown in Figure 1. In this figure, each experimental point represents the average of results obtained on two specimens. In no case did the duplicates differ by more than 0.1 per cent. The specimens were stored in air at 20 to 25°C. (68 to 77° F.). Tests conducted on specimens ½ hour, 2 hours, 6 hours, 24 hours, and 1 week old showed that the flow of specimens 24 hours old or older did not vary to any appreciable extent. Since the data in Figure 1 are typical of the currently available compounds, there seems to be no reason for extending the age of the specimens used in the test for flow beyond the 24 hour value in the present specification.[2]

An experiment was carried out to evaluate the effect of small temperature changes on flow results. In Figure 2 are plotted the averages of the results obtained on two specimens at various temperatures, for each of four compounds. The steepness of the curves at temperatures near 40°C. should be noted.

Practically 70 per cent flow occurred between 38.0°C. (100.4°F.) and 42.0°C. (107.6°F.), and at or near 40.0°C. (104.0°F) a change of 0.1°C. (0.18°F.) in the temperature at which the compound was tested could make approximately a 2 per cent difference in the flow values.

Therefore, it was decided to delete the requirement specifying a determination for the flow at 40.0°C. (104.0°F.). Furthermore, past experience[1] shows that the requirements of flow at 37.0°C. (98.6°F.) and at 45.0°C. (113.0°F.) are sufficient to define a satisfactory compound.

Table 5 • Data exchanged with Manufacturer Y using revised methods on impression compound furnished by him and not the same lot or batch as reported in Table 4

Result	Per cent flow at		
	37°C. (98.6°F.)	40°C. (104°F.)	45°C. (113°F.)
A	3.8	47.1	90.5
B	4.6	53.4	92.3
C	2.2	36.4	90.4
D	3.1	45.1	92.6
Average	3.4	45.5	91.4

The third major consideration was the chilling of the top of the flow specimen by the metal platen of the test apparatus (C, Fig. III). The truncated cone-shaped specimen resulting from the flow test (A, Fig. 3) indicates that the temperature of the top of the specimen was not as high as the temperature of the bottom. A symmetrical barrel-shaped flow specimen (B, Fig. 3) shows the effect of testing a specimen which was apparently nearly uniform in temperature throughout. To produce this type of flow specimen, it was necessary to reduce the conduction of heat from the specimen through the

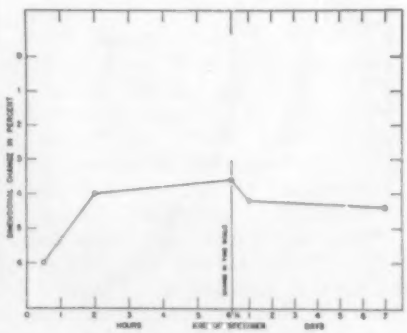


Fig. 1 • *Decrease in flow of impression compound with increase in age of specimen tested at 37° C. (98.6° F.)*

platen and its shaft. A hard rubber shaft (B, Fig. III) having a low thermal conduction was, therefore, substituted for a metallic shaft having a high thermal conduction. Thus the temperature of the platen, which is submerged in a constant temperature bath, is maintained sufficiently close to the temperature of the bath to cause the formation of symmetrically shaped specimens during the test for flow.

In addition to the change in shaft, the diameter of the platen (C, Fig. III) was increased from ½ inch to 2 inches. This was necessary since the compound at 45.0°C. (113.0°F.) flowed out under the ½ inch platen and up its side.

Results Obtained with Revised Procedures • An attempt was made to determine the effectiveness of the new specimen preparation and test procedure by exchanging specimens and data obtained by an additional series of tests with Manufacturer Y (Table 5). Although the number of tests made was not large enough to evaluate completely the revised procedures, the following comparisons of results listed in Tables 4 and 5 indicate that closer agreement in test results probably will be obtained. If Result G is compared with Result H at 40°C. in Table 4, there is a difference of 24.2 per cent flow. Since this would be attributed to the testing procedure, it can be seen that Result C compared with Result D at 40°C. differs by only 8.7 per cent flow which indicates better agreement between testing laboratories. Then if the difference between Results E and G in Table 4 is compared with that between Results A and C at 40°C. in Table 5, a reduction can be seen from 23.0 to 10.7 per cent flow difference in results. Reference to Table 1 will show that this difference is attributed to preparation of the flow specimens. Since the 40°C. flow testing temperature is a critical point, the differences in results obtained are magnifications of those obtained at 37°C. and 45°C. On comparing the flow results at these two temperatures, however, there appears to be a trend toward better agreement between testing laboratories in both preparation and testing of flow specimens (Table 5).

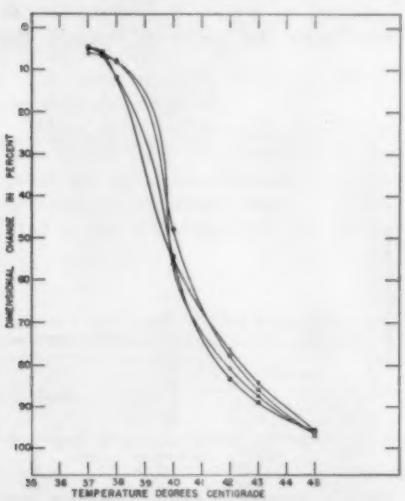


Fig. 2 • Flow of impression compounds

SUMMARY AND CONCLUSIONS

The American Dental Association specification for dental impression compound was revised with the assistance of the Specifications Committee of the Dental Materials Group of the International Association for Dental Research, with the aid of three manufacturers, and with the information derived from a recent survey of the certified brands of dental impression compounds.

Two major changes were made in the detail requirements. First, since the 40.0°C. (104.0°F.) flow testing temperature represented a critical point in testing, the requirement for flow at this temperature was deleted. Second, the requirement for flow at 50.0°C. (122.0°F.)

for tray compound was replaced with a requirement for flow at 45.0°C. (113.0° F.). Therefore, in the revised specification, both impression compound and tray compound will be tested at the same temperatures in determining values of per cent flow.

After examination of possible variables introduced in preparation and testing of flow specimens, and after examination of results of the data exchange program, more precise methods for preparation and testing of specimens for flow were incorporated in the revised specification.

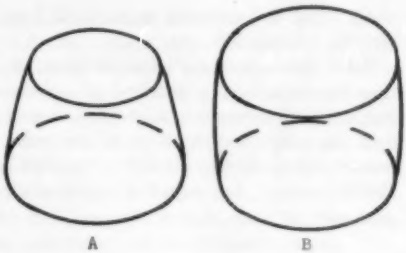


Fig. 3 • Flow specimens. A: Truncated-shaped specimen formed using metal shaft. B: Barrel-shaped specimen formed using nonconducting shaft

AMERICAN DENTAL ASSOCIATION SPECIFICATION NO. 3 FOR DENTAL IMPRESSION COMPOUND

Second Revision (to be effective July 1, 1956)

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification is for dental impression compound, sometimes called modeling compound. This compound is thermally reversible, rigid when cold and plastic when heated a few degrees above mouth temperature.

1.2 Classification.

1.2.1 Types. Dental impression compound covered by this specification shall be of the following types as specified:

Type I. Impression compound
Type II. Tray compound

2. APPLICABLE SPECIFICATIONS

2.1 Specification. There are no other specifications applicable to this specification.

(Copies of American Dental Association specifications may be obtained free upon application to the National Bureau of Standards Fellowship Division of the Council on Dental Research of the American Dental Association, National Bureau of Standards, Washington 25, D. C.)

3. REQUIREMENTS

3.1 Material.

3.1.1 Type I. The material shall be suitable for taking impressions in the oral cavity.

3.1.2 Type II. The material shall be suitable for forming trays to be used in the oral cavity.

3.2 General. The compound shall have the following properties:

3.2.1 Homogeneity throughout.

3.2.2 A smooth, glossy surface after flaming.

3.2.3 Firm, smooth margins after trimming with a knife at room temperature.

3.3 Detail

3.3.1 Flow. Type I Compound

3.3.1.1 The flow at 37.0°C. (98.6°F.) shall not be more than 6.0 per cent.

3.3.1.2 The flow at 45.0°C. (113.0° F.) shall not be less than 85.0 per cent.

3.3.2 Flow. Type II Compound

3.3.2.1 The flow at 37.0°C. (98.6°F.) shall not be more than 2.0 per cent.

3.3.2.2 The flow at 45.0°C. (113.0° F.) shall not be less than 70.0 per cent nor more than 85.0 per cent.

3.3.3 Impression Test

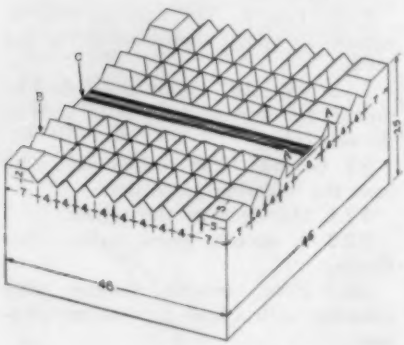
3.3.3.1 Type I compound shall record accurately the surface detail of the test

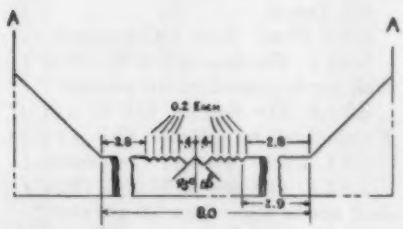
block (Fig. I) referred to in 4.3.2.2 at 45.0°C. (113.0°F.).

3.3.4 Manufacturer's Instructions. Instructions, including method of softening, working temperature, and a curve or data showing the shrinkage of the compound from 40°C. (104°F.) to 20°C. (68°F.) shall be supplied with each package.

4. SAMPLING, INSPECTION AND TESTING PROCEDURES

4.1 Sampling. Three packages or approximately one and one-half pounds of compound shall be procured at retail by a member of the American Dental Association. This sample shall be forwarded in the original unopened package or packages to the National Bureau of Standards Fellowship Division of the Council on Dental Research of the American Dental Association at the National Bureau of Standards, Washington 25, D. C.





All dimension in millimeters.
All grooves, 90° included angle, sides at 45° to surface of block. All dimensions to be held to ±0.02 mm.

Fig. I • Test block for dental impression compounds

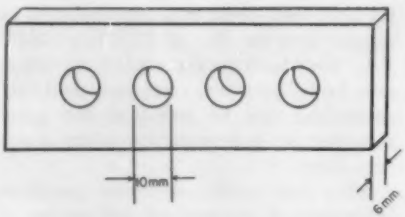


Fig. II • Mold for forming flow specimens

4.2 Inspection. Visual inspection shall be used in determining compliance with the requirements outlined in 3.1, 3.2, 3.3.4, 5.1 and 5.2.

4.3 Physical Tests.

4.3.1 Flow

4.3.1.1 Preparation of specimens. A cake or cakes of compound shall be broken into pieces and placed in an iron crucible of 50 ml. capacity. The crucible shall be placed 130 mm. (5.1 in.) below a 250 watt infrared lamp bulb. The stirred compound shall be heated to a temperature of 75 ± 5°C. (167 ± 9°F.) (checked with a thermometer) until melted throughout and then shall be poured into a mold (Fig. II). The mold shall be a flat, stainless steel metal plate 6.0 mm. (0.236 in.) thick, containing four holes 10.0 mm. (0.394 in.) in diameter. The mold shall be preheated to a temperature of 55 ± 5°C. (131 ± 9°F.) and placed on a smooth glass slab [152 mm. long, 76 mm. wide, 19 mm. thick (6 in., 3 in., and 0.75 in.)] preheated to the same temperature. After the mold has been overfilled with material, a smooth flat tin-foil-covered glass plate preheated to 55 ± 5°C. (131 ± 9°F.) shall be placed on top of the mold. A load of 9,000 Gm. (20 lb.) shall be applied to the top of the tin-foiled glass plate for ten minutes. Then the mold shall be placed in water

at a temperature of 10°C. (50°F.) for ten minutes. The upper tin-foiled plate shall then be removed and the excess material shall be trimmed away. This can be accomplished by using a metal scraper with the top surface of the mold as a guide. The mold may then be removed from the glass slab by gently tapping the side of the mold. The specimens shall be removed from the mold by chilling in water for ten minutes at 10°C. (50°F.) and shall be stored at room temperature 20 to 25°C. (68-77°F.) for 24 hours before testing.

4.3.1.2 Method of test. The original length of the specimen shall be determined using a metric micrometer caliper. Four measurements shall be made around the circumference and one measurement shall be made on the center of the specimen. The measurements shall be recorded to the nearest 0.005 mm. The specimen and flow testing instrument (Fig. III) shall be placed in a water bath and held at the testing temperature for 20 minutes prior to testing. The flow testing instrument as illustrated consists of the following: A, a weight; B, a nonconducting shaft; and C, a brass platen. The total weight in air of these three components is 2,000 Gm. (4.41 lb.). The weight A shall be separated a minimum of 76 mm. (3 in.) from the brass platen on the shaft. This shaft shall be of hard rubber or of a similar poor thermal conductor to avoid loss in heat due to conduction. The diameter of the brass platen which touches the specimen shall not be less than 51 mm. (2 in.). The thickness of the brass platen shall not exceed 6.5 mm. (0.25 in.). The temperature in the bath shall be controlled to within ± 0.1°C. (± 0.2°F.) of the required temperature. (A calibrated thermometer shall be used for determining the temperature.) A thin sheet of waterproof cellophane shall be placed between the instrument and each end of the specimen. The bottom of the specimen shall be 51 mm. (2 in.) below the surface of the water in the bath. A constant axial load of 2,000 Gm. (4.41 lb.) shall then be applied to the specimen for ten minutes, after which the specimen shall be removed and cooled in air to room temperature. The cellophane shall be stripped off, and the final length shall be determined as is the original length. The flow, as evidenced by the change in length, shall be reported as percentage of the original length. The value for flow at any temperature shall be the average value for two specimens and shall be reported to the nearest 0.1 per cent.

4.3.2 Impression test.

4.3.2.1 Preparation of impression specimen. The impression specimen shall be a disk 40 mm. (1.57 in.) in diameter and between 4 mm. (0.16 in.) and 7

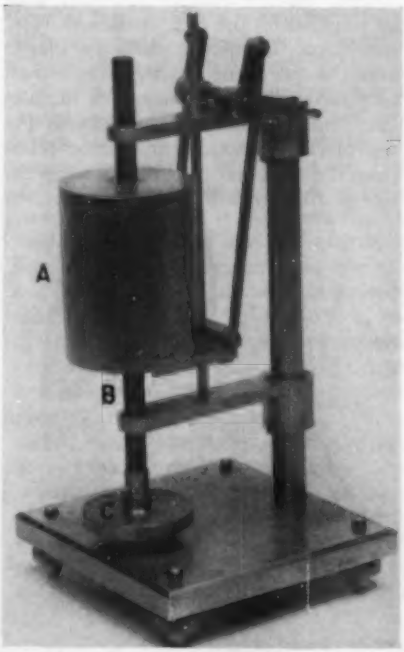


Fig. III • Flow testing instrument. A: Weight. B: Nonconducting shaft. C: Platen

mm. (0.28 in.) in thickness. The cake of compound shall be warmed in water and the disk cut. If the cake is thinner than 4 mm. (0.16 in.), two cakes shall be flamed and pressed together before cutting the disk.

4.3.2.2 Method of test. A water bath shall be adjusted to 45.0 ± 0.1°C. (113.0 ± 0.2°F.). A flat plate (to support the specimen while it is coming to the required temperature), a test block (Fig. I) and a brass weight, having a base 50 mm. (1.97 in.) in diameter and weighing 1,000 ± 5 Gm. (2.2 ± 0.01 lb.) in air, shall be placed in the bath and allowed to come to the temperature of the bath. [The water level in the bath shall be 30 ± 5 mm. (1.2 ± 0.2 in.) above the top surface of the test block.]

The impression specimen shall then be placed in the water bath on the flat plate. Twenty minutes later, the specimen shall be centered on the test block, a sheet of waterproof cellophane shall be placed over the specimen, and the weight shall be placed on the specimen. Ten minutes later, the weight shall be removed, the test block and specimen shall be taken from the bath and chilled at a temperature of 10°C. (50°F.), and the specimen shall be removed from the test block.

The impression shall be examined to determine if the ridges corresponding to the large cross grooves (B, Fig. I) of the test block are sharp, and the ridges corresponding to the fine grooves (C, Fig. I) are complete and visible to the unaided eye for at least 30 mm. (1.2 in.) of their length.

5. PREPARATION FOR DELIVERY

5.1 Packaging. The material shall be packaged in accordance with accepted commercial practice.

5.2 Marking.

5.2.1 Lot numbers. Each container shall be marked with a serial number or a combination of letters and numbers which refer to the manufacturer's records for the particular lot or batch of compound.

5.2.2. Date of manufacture. The date of manufacture (year and month) shall be given on the container either as a separate item or as a part of the lot number (5.2.1).

5.2.3 Net weight. The minimum net weight of the contents shall be indicated on all containers.

Advance of Science • There seems to be a natural law that regulates the advance of science. Where only observation can be made, the growth of knowledge creeps; but where laboratory experiments can be carried on, knowledge leaps forward. *Faraday.*

The self-employed dentist and O.A.S.I.

Bernard J. Conway, LL.D., Chicago

During the past seven years the House of Delegates of the American Dental Association has, at each of those seven annual sessions, either discussed or acted upon the O.A.S.I. question. At the 1948 session the House recommended that the Association support the inclusion of the self-employed members of the dental profession. At the 1949 annual session the House directed that the Association oppose such coverage. In 1952, 1953 and 1954 the House rejected resolutions urging that the Association support O.A.S.I. coverage for self-employed dentists. The 1954 House of Delegates, moreover, rejected both compulsory and elective coverage. The vote against compulsory inclusion was 235 to 152; the vote against elective coverage was 180 to 153. Why has the House of Delegates, since 1949, consistently opposed the inclusion of self-employed dentists within the O.A.S.I. program?

Dentists for the most part are self-employed. In evaluating the advantages and disadvantages of this social security measure, then, a dentist should first be aware that the O.A.S.I. law treats the self-employed groups differently from the employed groups. Second, by reason of the self-employed status, a dentist ordinarily is under no compulsion to retire at any given age; age 65, then, need not be the end of the game for dentists as it is for the majority of employed persons. Third, as members of a health profession providing a vital health service to the public, a dentist might wish to consider what effect a pattern of retirement by dentists at age 65 might have on the availability of dental services for a sharply increasing population. Fourth, if dentistry decides to seek O.A.S.I. coverage for its self-employed members, that decision will bind all those entering the profession in the future. The ramifications of those important considerations undoubtedly must have determined the position of the Association's House of Delegates.

What is O.A.S.I.? It is one feature of a rather broad program of social security which has been developed jointly by the federal government and the states. The old age and survivors plan is completely administered by the federal government. Each of the social security programs, however, theoretically has a common denominator. Each is intended to provide a partial replacement of income to an individual who is forced out of gainful employment for a cause over which he has no control. The O.A.S.I. program presumes that most workers are forcibly retired from gainful occupations at age 65 or thereabouts. That is true for most industrially employed persons and many other employed groups. The self-employed dentist, however, is under no compulsion to retire at age 65. Except in unusual cases, dentists continue working

Presented before the Connecticut State Dental Association annual meeting, May 18, 1955, Hartford, Conn.

Secretary, Council on Legislation, American Dental Association.

throughout their lives. It is estimated that the mean age of retirement for dentists is between 68 and 70 years and probably closer to 70, according to the Association's Bureau of Economic Research and Statistics. There are, according to the Bureau, about 6,500 dentists between the ages of 65 and 72 years, the majority of whom are still in practice.

The age at which an individual retires is most important. The O.A.S.I. program does not assure a covered individual an annuity after he reaches age 65. In order to collect his full old age benefits, a covered individual may not, between the ages of 65 and 72, earn more than $1,200 a year. For each $80 he earns over that amount, one month's benefit will be deducted. If the wife of that covered individual is past age 65 and receiving benefits, her benefits will be proportionately reduced. Only after a covered individual reaches age 72 are he and his dependents assured of their full benefits if that individual earns more than $1,200 a year. If it is assumed that the life expectancy of most dentists is 70 years of age, and that the majority of dentists continue to earn substantial yearly incomes until they reach that age, it is apparent that most members of the profession would not recover much in the way of old age benefits for themselves.

Attention is called again to a report of the Association's Bureau of Economic Research and Statistics. The Bureau's "1953 Survey of Dental Practice" discloses that the average annual net income of self-employed dentists between the ages of 65 and 69 years is $7,192; between the ages of 70 and 74 years the average annual net income is $5,842. It should be kept in mind, too, that, no matter how old a person is, he must continue to pay the employment or self-employment tax on the first $4,200 of his annual income.

Again it should be emphasized that not only are the circumstances determining the age of retirement different as between employed and self-employed persons; the provisions within the O.A.S.I. law treat those groups differently. Most important, the self-employed person covered under O.A.S.I. pays one and one-half times as much each year as does the employed person, assuming of course that each earns at least $4,200 a year. That consideration, then, is material in determining the actual benefit a self-employed person will gain from O.A.S.I. coverage. The following is a specific example. A dentist enters the system in 1955 at age 25. Assuming he earns over $4,200 a year, he will, under the present schedule, pay $8,460 in taxes by the time he reaches age 65. His wife will probably be 62 years of age at that time, and their children, if any, will ordinarily be more than 18 years of age. The best estimate of life expectancy for the dentist and his wife is 70 years for the dentist and 75 years for his wife.

If this hypothetical dentist retires at age 65 and applies for his benefits, he will receive the yearly maximum in benefits until his death at age 70, a total of $6,510. His wife will receive a wife's benefits for two years while he is still alive, or $1,302. At his death, she will receive a lump sum death benefit of $255. During her remaining life expectancy of eight years, she will receive a widow's benefit amounting to $7,752. Thus the total benefit for the family will be $15,819 for a tax contribution of $8,460.

The fact that the dentist and his wife will receive more in benefits than he paid in tax may sound impressive. But if this dentist had invested over the same 40 year period in a savings plan which paid 3 per cent per year compounded on a semi-annual basis, he would have accumulated $15,418 by the time he reached his sixty-fifth birthday (assuming that he invested annually an amount equal to the yearly O.A.S.I. tax). That is only about $388 less than the total benefits he and his wife will receive from O.A.S.I. If the dentist and his wife with-

drew from his saving fund after age 65 monthly amounts equivalent to the O.A.S.I. benefits for himself and his wife, there would be $2,752 left in the saving fund after the wife's death at 75 years of age. Regardless of the amount contributed into O.A.S.I., there is no capital fund available after the last family beneficiary dies.

If this hypothetical dentist practices until the time of his death at age 70, and earns more than $4,200 during that 45 year period, he will of course receive nothing in old age benefits for his $9,620 contribution. His wife will not be eligible for benefits until after his death. She will receive $255 as a lump sum death benefit and $7,752 in widow's benefits before her death at age 75. The dentist and his family would, therefore, receive $8,007 in benefits for a tax contribution of $9,620. Again, if he had paid for 45 years at his O.A.S.I. rate into a savings program at 3 per cent interest compounded semi-annually, he would have accumulated a capital fund of about $16,600. If his wife withdrew from that fund at the rate of her O.A.S.I. benefits, there would be $8,593 left for testamentary disposition.

The example cited is a typical case. As pointed out earlier, it is only fair to evaluate the advantages and disadvantages of O.A.S.I. coverage from the point of view of those dentists who will have to contribute over the full span of their practice years. To the extent that an individual is closer to 65 than 25, he will, of course, pay proportionately less in taxes, and there will be a more favorable difference between his tax contribution and the benefits he and his family may expect to receive. That difference would be particularly favorable for dentists now in their fifties and early sixties, should the profession be covered under O.A.S.I. at an early date.

It should also be kept in mind that Congress may decide to increase the contributions. In fact, the annual payments to beneficiaries is almost certain to increase each year out of proportion to the increases in tax contributions. The easiest way to make up the difference, apparently, is to raise the amount of each covered individual's income subject to the O.A.S.I. tax. That amount has, in recent years, been increased from $3,000 to $3,600, then to $4,200. It is apparent, also, that Congress might favor including new types of benefits under the Social Security program (such as hospitalization benefits for retired beneficiaries and their dependents or cash sickness benefits) rather than to increase the amounts of present benefits.

The survivor's benefit provided by the O.A.S.I. program, other than the widow's benefit, have not been discussed. Those are the benefits paid to a surviving mother of any age who has children under the age of 18 in her care, and the benefits paid to the children themselves until they reach the age of 18. It is true that, to the extent that dentists may die early in life leaving a widow and young children, the O.A.S.I. benefits are favorable. But how many dentists die at an age which would make the survivors' benefits a distinct advantage? Phillip M. Chernoff, a member of the Connecticut State Dental Association, discussed this question in his excellent article entitled "The Problem of O.A.S.I. and the Dentist." Doctor Chernoff developed some pertinent information from the statistics compiled by the Association's Bureau of Economic Research and Statistics. He stated in his article:

> These statistics show: only 1.5 per cent of all dentists died between 35 and 39; that 5.6 per cent died between 45 and 49; that 10 per cent died between 50 and 54. These are the age groups that would be most likely to have children under 18. It would be reasonable to conclude from these figures that about 20 per cent of all dentists would leave children under 18 at time of death. Many in the 50-54 age group would have children very close to the eighteenth birthday, when benefits would cease; and the total of payments in these cases

would therefore be of small amount. It becomes obvious that on an over-all group basis, the feature of payments to minors under 18 after a dentist's death has less than one-fifth the value it suggests.

In his article Doctor Chernoff also shows the advantages of a straight life insurance policy to the younger members of the profession. That discussion illustrates how life insurance may be adapted to a plan for providing a good measure of assured income for survivors. It should be kept in mind that the widow of a young dentist will receive no O.A.S.I. benefits upon his death unless she has children in her care. She will not become eligible for widow's benefits until she reaches the age of 65.

It is essential to bear in mind that there is no capital fund developed for a beneficiary of O.A.S.I. and his family. The examples cited make that apparent. Many persons who support O.A.S.I. have made a great point of the fact that it would take a capital fund of $40,000 invested at 5 per cent to provide, in dividends, the $1,953 which a retired individual and his wife may expect to receive annually in O.A.S.I. benefits. Others, including Administration spokesmen, have pointed out that it would take in excess of $32,000 invested at 4 per cent to provide maximum annual benefits to a retired individual alone. Although it is true that the return on those capital funds would be the equivalent of maximum O.A.S.I. benefits in each case, it is likewise true that there is no such capital fund available to the individual to use at his discretion or for testamentary disposition. When the survivors of a covered O.A.S.I. beneficiary die or reach the age of 18, there is no capital fund to distribute among the living survivors.

In order to establish a proper comparison of O.A.S.I. benefits to the return on invested capital, one need only consider a sum sufficient in size to permit withdrawals at the same rate as O.A.S.I. benefits are paid. As illustrated in the examples presented, that amount would be in the order of $12,000 to $15,000.

At the outset the need for assuring a continued increase in the amount of dental services for the sharply increasing population was mentioned. There is certainly no surplus of dentists today, according to those who have studied the availability of dental health care. The defense needs of this country, furthermore, require the services of about 6,000 dentists. Should self-employed dentists be included within the O.A.S.I. program, a large number might be tempted to retire at age 65 to take full advantage of their benefits. If that were to occur, the public might be the loser in terms of available dental services.

Great Deficit • Sherlock Holmes, in speaking of Francois de Villard, the French detective, said: "He possesses two out of the three qualities necessary for the ideal detective. He has the power of observation and that of deduction. He is wanting only in knowledge . . ." Wilton Marion Krogman, *"Sherlock Holmes as an Anthropologist," Scientific Monthly 80:155 March 1955.*

Cases and Comments

MONILIA INFECTION OF THE GUMS

The following query with replies from three consultants appeared in the *Journal of the American Medical Association*, October 9, 1954, and because of its specific application to dentistry, it is being republished here.

Query • Please advise me about treatment of yeast infection of the gingiva. I have treated a patient for one year with gentian violet, 1 per cent solution. What other measures should I try?

M. R. W., M.D., Alton, Ill.

Reply • The age of the patient, the clinical observations or the basis for the diagnosis of "yeast infection of the gingiva" are not stated in the query. It would be unusual to find the lesions of a monilial infection limited to the gingival tissues. It should be first ascertained that there are no sources of traumatic irritation that might predispose to a chronic gingivitis. Trauma to the gingival tissues may result from calculus, inadequate dental restorations, malposed teeth or occlusal overfunction. Improper oral hygiene habits also may be a predisposing cause. These conditions, if present, should be checked and corrected by the patient's dentist. If the yeast infection still persists, the topical application of 10 per cent aqueous sodium caprylate solution may be effective.

Reply • It is assumed that the case in reference is associated with Monilia. Monilial infection of the gingiva alone is rare. The oral moniliosis usually is associated with generalized moniliosis. In many cases of generalized moniliosis some debilitating preexisting disease is present. There is no recommended treatment of value. Gentian violet appears to minimize secondary infection. In all cases of a chronic nature, a thorough search for systemic disease must be made.

Reply • In view of the length of time for which the condition has been resistant to a form of treatment that usually brings about remission in one or two weeks, diagnostic tests should be repeated to determine whether this is a case of moniliasis. For the treatment of moniliasis, authorities in oral medicine recommend topical application of 1 per cent gentian violet solution three times a day after meals. The correspondent did not indicate whether this schedule was followed.

Other forms of therapy that have been reported beneficial in some cases include roentgen and ultraviolet irradiation, a high vitamin diet reinforced with vitamin A up to 150,000 units daily, massive doses (100,000 units daily) of calciferol, and saturated solution of potassium iodide up to 20 drops three times daily. "Shotgun" vitamin therapy, however, has no scientifically sound basis, and prolonged administration of large doses of vitamins A and D_2 is not without hazard from hypervitaminosis.

Radiation should not be resorted to unless all other methods fail. If the lesions are sponged with a 10 per cent solution of sodium sulfite, the fungus may more readily be scraped off; care should be taken to avoid bleeding during this procedure. Application of gentian violet solution may then be undertaken three times daily after meals. Propionate or caprylate preparations are of value in the control of vaginal moniliasis, and these preparations might be used in the present case on a trial basis before drastic measures are undertaken.

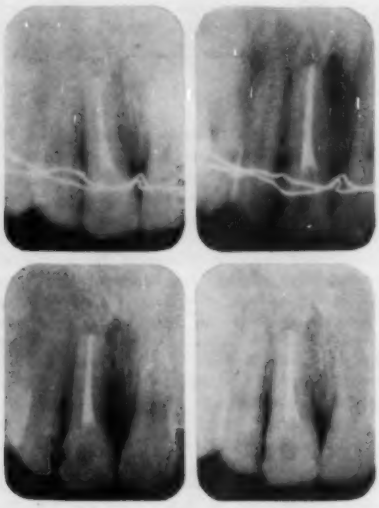
REPLANTATION OF CENTRAL INCISOR

By Edward N. Green, D.D.S., New York.

A 21 year old white man came to the dental clinic November 2, 1954. During football practice he had been hit in the mouth with the shoe spike of another player, his lower lip was split open, the buccal gingiva and bone in the upper incisor region were lacerated and the upper left central incisor was cleanly removed.

Examination revealed a few loose spicules of bone, the region caked with dried blood and pieces of soil contaminating the socket. Only slight pain was present. The occlusion was favorable since there was no incisor contact in any excursion of the mandible.

Treatment consisted of first scraping the tooth thoroughly with a sharp knife to remove the clinging tissue. About 2 mm. of the apex was cut off and 0.5 mm. of the incisal edge ground in anticipation of slight elongation (an expectation which later proved correct). The entire tooth was polished with sandpaper disks of varying coarseness; particular attention was paid to the root itself.



Roentgenograms reveal early resorption of alveolar crest after replantation of left central incisor. Later films indicate cessation of resorption. Tooth shown day of operation, 21 days, 41 days and 4 months later

The root canal was reamed and filed completely through an opening made in the lingual portion of the crown in the conventional fashion. The canal was dried with a redhot platinum needle. Gutta percha points were placed with modified (rosin) zinc-oxide and eugenol cement, condensed, the apex burnished and the tooth placed in a 1:1,000 solution of benzalkonium chloride for 20 minutes.

Careful débridement of the gingival wound was carried out and the tissues painted with tincture of thimerosal, 1:1,000. The socket was curetted gently to remove soil and debris. A single suture was placed in the lower lip, which had been split open to a depth of about 5 mm. No anesthesia was used.

The left central incisor was dried with a sterile sponge and replanted firmly into the socket. A .020 inch diameter stainless steel orthodontic wire was used for immobilization, joining together the right central incisor, the left lateral incisor and the left cuspid. Penicillin (300,000 units) was administered.

The patient played football the two following weekends, wearing a special plastic face guard and rubber mouthpiece to cover the upper teeth. The open bite condition in the incisor region ruled out danger of trauma from tooth contact.

The wire was removed three weeks later. The tooth showed a mobility of about 2 mm., decreasing to less than 1 mm. a month after removal of the wire.

The gingiva has remained pink and healthy, although slight recession is apparent. Study of the roentgenograms (illustration) discloses early resorption of the alveolar crest, but later films indicate a cessation of this process. Continued roentgenographic observation will tell whether or not further resorption takes place.

Captain, Dental Corps, U.S. Air Force, 38th Tactical Hospital, APO 17, New York.

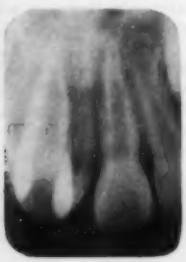
SUPERNUMERARY TEETH

By Stanley N. Schwartz, D.D.S., Forest Hills, N. Y.

Two brothers, aged six and ten, were examined recently. The roentgenograms revealed a supernumerary tooth near the midline between the deciduous central incisors of the six year old and one near the midline between the permanent central incisors of the ten year old (illustration).

In the older boy, the tooth had erupted lingually to the central incisors and was forcing the right central incisor out of occlusion. Several weeks after extraction of the supernumerary tooth, the right central incisor was almost back to normal position.

Supernumerary teeth can be divided into two classes: teeth resembling the normal tooth

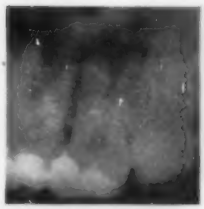


Left: Mesiodens between deciduous central incisors of six year old. Below: Between permanent central incisors of ten year old

form and small peg-shaped teeth that bear no resemblance to any normal tooth form. Supernumerary teeth may occur anywhere in the dental arch. The majority of them are found in certain regions, one of which is the region of the upper central incisor. The peg-shaped form is usually termed "mesiodens."

It is interesting to note the existence of a similar mesiodens in the six and ten year old brothers in this report.

71-57 Austin Street



Left: Left periapical view of upper second and third molar region. Center: Right periapical view. Below: Occlusal view shows supernumerary teeth clearly

ROENTGENOGRAPHIC INADEQUACY IN ORAL DIAGNOSIS

By Willis L. Supler, Jr., Pittsburgh.

A white girl, aged 16, was examined at the University of Pittsburgh Dental Infirmary in October 1953. The patient's chief complaint was a toothache in the lower left bicuspid region. An oral examination and a routine full-mouth roentgenographic examination were made. The roentgenographic examination included 14 periapical films and two bitewing roentgenograms. The patient was treated for extensive caries.

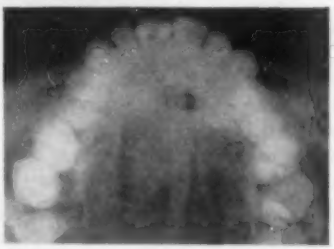
In December 1954 the patient returned to the infirmary. Oral examination disclosed a few carious lesions and a supernumerary tooth which had erupted through the alveolar tissue between the upper right second and third molars on the buccal side. Apparently the tooth was in a normal vertical position.

On study of the roentgenograms that had been made the previous October, the faint outline of a supernumerary tooth was seen in the upper left molar region. No sign of any supernumerary tooth was discovered on palpation of this region. Again the roentgenograms were referred to and on closer scrutiny outlines of supernumerary teeth could be seen in both the upper left and right second and third molar regions.

Periapical and occlusal views were made of both regions. The supernumerary teeth could be seen (illustration).

This case report demonstrates the following points. Roentgenograms do not show depth. Therefore, foreign bodies, impacted and supernumerary teeth, which are not easily seen or located in the routine roentgenographic survey, must be localized by using a different angulation, and by using extraoral and occlusal views.

In studying a set of roentgenograms, some means of magnification or projection of the individual roentgenogram can be a valuable aid in diagnosis.



Although roentgenograms are an indispensable part of any dental examination, they are not faultless and must be supplemented by other technics of oral and dental examination.

6833 Meade Street

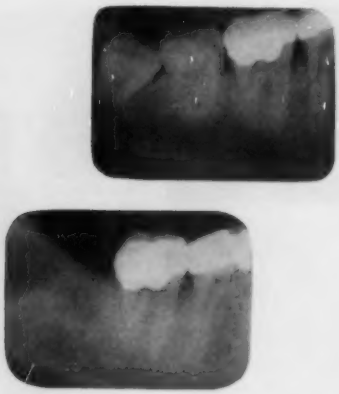
Junior student, School of Dentistry, University of Pittsburgh.

FOURTH MOLARS

By Bernard B. Fogel, D.D.S., Kansas City, Mo.

A white woman, aged 20, came for routine roentgenographic examination. The roentgenograms disclosed a carious lower left third molar with roots almost completely formed. An impacted fourth molar in slight mesial inclination was observed.

Subsequent roentgenograms showed that this fourth molar had a fully formed crown but that formation of the apical third of the roots was not completed (illustration, above). On January 16, 1954, the third and fourth molars were extracted under local anesthesia.



Above: Impacted fourth molar with fully formed crown and partially formed root. Below: Region one month after extraction of third and fourth molars

No drains were used, and five days later the sutures were removed. Recovery was uneventful (illustration, below).

The patient informed the dentist that her brother also had a lower left fourth molar. Neither of these patients had any other fourth molars.

Professional Building

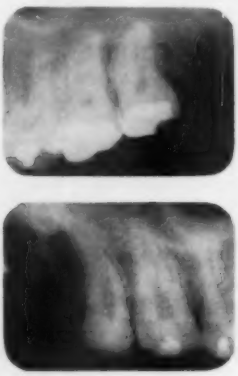
TUBEROSITY EXTENSION OF THE MAXILLARY SINUS

By Cyril B. Kanterman, D.D.S., Uniontown, Pa.

In the March issue of THE JOURNAL, page 329, a condition in which the maxillary sinus extended into the alveolar process almost to the crest of the ridge was reported. The present discussion concerns a similar condition, in which the maxillary sinus extends into the tuberosity, distally to the third molar.

Instead of the definite bone cancellations seen in the tuberosity of normal density (illustration, above), the tuberosity with sinus extension is characteristically radiolucent (illustration, below). As a result of sinus expansion, the antral wall along the posterior inferior extent of the sinus is considerably thinned and is reduced to a fragile partition of bone.

The practical implication of this condition is apparent. Even with careful luxation, the possibility of tearing out the tuberosity during extraction of the third molar is great. Thus,



Above: Tuberosity of normal density. Below: Antral wall of tuberosity thinned as result of maxillary sinus extension

surgical removal of the third molar is indicated in such cases.

Extension of the maxillary sinus into the tuberosity is not common. Nevertheless, the preoperative roentgenogram should be used to detect this condition and to prevent the complication of sinus involvement.

95 East Fayette Street

COUNCIL ON DENTAL RESEARCH
COUNCIL ON LEGISLATION

Statement of American Dental Association on dental health and research appropriations

On May 19 representatives of the Council on Legislation and the Council on Dental Research appeared before the Senate Appropriations Subcommittee on Labor, Health, Education, Welfare and Related Agencies and presented a statement on behalf of the Association with respect to the proposed appropriations for dental health and dental research contained in H.R. 5046.

Floyd W. Pillars, member of the Council on Legislation, spoke in support of the dental health activities of the U.S. Public Health Service and H. Trendley Dean, secretary of the Council on Dental Research, testified on the specific needs of the National Institute of Dental Research. Also present at the hearing was Mr. Bernard J. Conway, secretary of the Council on Legislation. The statements by Doctors Pillars and Dean follow:

DR. PILLARS' TESTIMONY

One of the primary purposes of the American Dental Association is to promote and support investigation into all aspects of dental science. To this end, the Association has established, and is now supporting with its own funds, a number of fellowships at the National Institute of Dental Research and at the National Bureau of Standards. Our Councils on Dental Therapeutics, Dental Research, and Dental Education have developed and are pursuing programs to foster an ever-expanding program of dental research and investigation in the dental schools and in other nongovernmental facilities. In support of these activities, the Association spends over $220,000 a year.

The National Institute of Dental Research is the focal point of this nation's dental research activity. Its own scientific investigations, its grants to support dental research projects in nongovernmental facilities, its fellowship awards to train qualified persons in dental research technics, and its publications disseminating information to the profession combine to earn for it this paramount position. Since the Institute was founded it has contributed a considerable amount of knowledge to benefit the citizens of this country.

Being the focal point of the search for new knowledge in dental science, the Institute must have the necessary funds to develop and expand its internal research efforts and to support approved projects in private facilities. The National Institute of Dental Research is today a mature and established member of the National Institutes of Health; it requires support much beyond that which has been provided during the past few years. The Institute, for example, will be compelled to turn down a substantial number of worthy applications for dental research grants and fellowship awards during the next fiscal year unless more funds are appropriated. It is a fact that the dental research funds proposed within H.R. 5046 will support only a minimum addition to the existing program of research activity. Those funds will not permit the Institute to expand its program to meet the demands being made on it today.

Additional funds should be made available to the Institute in two areas to permit it to expand its support of dental research activity. First, the Institute could effectively utilize one million dollars to support approved dental research projects in the dental schools and

other nongovernmental facilities in this country. The sum proposed to be appropriated by H.R. 5046 of $421,000 will support approximately 46 research projects. Since each of those projects requires from two to three years to complete, the Institute can only accept about 15 to 20 new projects a year. It can anticipate receiving three times this number of worthy applications each year; the Institute, therefore, is in the unenviable position of having to turn down or defer many needed investigations that could now be undertaken by qualified individuals in the dental schools and in other nongovernmental facilities. The additional funds we recommend will enable the Institute to take on approximately 55 to 60 new projects for which sufficient approved applications are or will be on hand during fiscal year 1956.

Second, we are convinced that the Institute could effectively utilize $250,000 for fellowship awards with which to train qualified individuals for careers in dental research. The present appropriation of $100,000 will support only 23 such Fellows. Since each fellowship training program requires about two to three years to complete, the Institute can accept less than 10 new individuals for training each year. This program is vitally important since it trains persons who will be our dental research men tomorrow. The nation urgently needs them for our laboratories and schools. The additional funds we recommend will enable the National Institute of Dental Research to expand this program so that it can be maintained on a level consistent with the foreseeable demand for dental research personnel in the near future.

You will recall, I am sure, the Association's testimony last year in which we urged that sufficient funds be appropriated to construct a research building for the National Institute of Dental Research at Bethesda, Maryland. The expenditure for that building was authorized by the Congress in 1948, and except for $100,000 spent to prepare plans, none of the $2,000,000 authorized by the Congress has been appropriated. The National Institute of Dental Research building is urgently required; the Institute has outgrown the space presently assigned it. The Institute of Dental Research building as planned would not only provide the needed additional area and facilities required but would permit a greater degree of coordination of personnel and projects. Although we do not claim that brick and cement will itself result in research activity, we believe that the additional space and the opportunity to consolidate activity will stimulate a greater efficiency and productivity. I am sure you will agree that instability of working area, scarcity of space, and the lack of proper integration cannot have other than a detrimental effect on the work of the Institute. This building has been long needed; its construction has been authorized; we urge that it be started in fiscal year 1956.

With your permission, I shall ask Dr. Dean to speak briefly on the importance of expanding the nation's dental research efforts. He has been associated in the past with the National Institute of Dental Research and on the basis of his experience I am sure he can give you much valuable information.

DR. DEAN'S TESTIMONY

Research should be one of the major activities of a modern dental school. Like any other school forming an integral part of a university, the dental school is obligated to further knowledge in its own particular sphere. Hence, an appreciable portion of a faculty member's time and a substantial share of the school's operating budget should be allocated to research. Improved teaching is the natural sequence of a well balanced research program and an increasing body of scientific knowledge.

To record again the magnitude of the dental problem in this country would be the height of redundancy. You all are familiar with the fact that few of our citizens escape its attacks. Moreover, you are all aware that the citizens of this country are spending close to a billion and a half dollars a year for dental services, and less than a majority is getting satisfactory dental service. The sole hope of ameliorating this condition is through research. The great triumphs in preventive medicine—triumphs which benefited countless millions of people—came as the result of research.

Dental research, particularly that kind of research known as basic or fundamental research, has for too long been neglected in dentistry. The past few years have seen an increasing concentration on this most important part of research. Its further expansion should be encouraged in every way possible. Recently I compiled a list of papers read at the annual meeting of the International Association for Dental Research for the past six years. This Association was founded 35 years age in New York City, is very largely American in membership and meets concurrently with the annual meeting of the American Association of Dental Schools. The papers, totaling 834, were classified on the basis of the institution of the senior author. While I am well aware that such a listing may seem to emphasize quantity rather than quality,

for example, multiple reporting of data which might well be included in one paper, such a compilation does suggest the trend of research and may afford some indication of research activity in our various dental schools. Several interesting points emerge on analysis. One, the number of papers read at the 1955 session was almost treble that read six years ago, in 1950; second, some schools are consistently outstanding in their contributions to the advancement of knowledge; third, a conscientious effort is being made by more and more of the schools to initiate or expand their research operations. The few schools with a lackadaisical attitude toward dental research are becoming fewer each year. Dental research is finally on the march and it is our fond hope that this pace can be encouraged and accelerated by an increased appropriation in the category known as "research grants." Dental research can use profitably and fruitfully a million dollars a year, instead of the $441,000 now in the budget. The inadequacy of this sum is readily apparent when one realizes that there are 43 dental schools in the U.S. and, in addition, dental research centers such as the University of Chicago, University of Rochester, and Eastman Dispensary, where no dental school exists.

Today, after ten years of fluoridation at Grand Rapids, Mich., Newburgh, N.Y., and Brantford, Ontario, we are in a position to begin an evaluation of fluoridation's full effect on dental health and the future practice of dentistry. Results today in these independent studies show a consistent reduction in dental caries of about 65 per cent in those born and reared in the community after the beginning of fluoridation. The returns on this research venture are now measurable in both a marked improvement in dental health and in savings of many millions of dollars per year.

The evidence today certainly heralds a change in dentistry, as revolutionary as that which occurred in medicine with the introduction of chemotherapy, antibiotics, and effective means of immunization. On the other hand, we cannot overlook the fact that not all of the population are users of a public water supply. Hence, basic and applied research must be expanded in order that dental caries, as well as dental conditions other than tooth decay, may be brought under an increased measure of control. This would particularly involve greatly increased efforts in the more complex field of the periodontal diseases. The next generation will probably see many earnest workers attempting to explore the fundamental processes associated with subcellular and cellular activity. Until we can learn more of the intracellular and intercellular vital processes of the cells composing the periodontal tissue, much of our approach to the problem will continue to be empirical. For an interpretation of much of this work, the dental scholar of the future will find himself increasingly engrossed in the fields of physiology, biochemistry, enzymology, cytochemistry, biophysics and numerous other disciplines that may provide information on the vital activity of these cells. Our partial victory over dental caries will become merely a delaying action if the teeth saved from dental caries are lost as the result of periodontal disease (pyorrhea).

In a transitional period such as this, one cannot too strongly urge the need for redoubled efforts in dental research. The need for basic research is great. The National Institute of Dental Research has made a noteworthy record in strongly adhering to fundamentals, basic research. An inspection of the "research grants" program of the Institute indicates that the same sound philosophy is characteristic of our schools and research centers. This is a healthy condition and may provide the groundwork for the advances of the next decade. The "research grants" program should be considerably expanded. Dental research is now at the level where at least a million dollars a year is needed for "research grants." I hope you will see that this need is met.

One other item in this budget should be increased; namely, the $100,000 amount listed under grants known as "research fellowships." As you all know, it takes a trained research mind to translate research dollars into research findings. It is also well known that the training of the Doctor of Dental Surgery or the Doctor of Medicine is directed largely toward the clinical practice of their profession. There is little in the undergraduate curriculum of either profession that prepares him for a career in the ever-increasing complexities of modern research. Hence, it is essential that the young graduate interested in research prepare himself in the basic science or sciences of his choice by taking several years of graduate school study. A new development in the fellowship program is the part-time fellowship program, to encourage a few selected dental students in each school to familiarize themselves with research studies going on in the school. This is a most worthy effort and a sound approach to stimulating young people in the way of research. Because of limited funds, an approved dental school may apply for only two research fellowships. We would urgently ask that the sum of $100,000 for "research fellowships" be increased to $250,000 so that the graduate school training can

be enlarged and so that the part-time fellowships may be increased from two to four in each dental school.

In many other fields research has been instrumental in sharply reducing the prevalence of disease. Dental research is now in a position to expand and to accept this challenge when funds are made available. The physical, social, and economic toll taken by dental diseases staggers the imagination. A few million dollars spent in research may very appreciably reduce the American dental bill which amounts to nearly a billion and a half dollars per year.

COUNCIL ON LEGISLATION
COUNCIL ON DENTAL EDUCATION

Council on Legislation urges Senate committee to include dental schools within proposed grant program for medical schools

On Friday, May 6, Ralph E. Creig of Cleveland, Ohio, a member of the Council on Legislation, and Shailer A. Peterson, secretary of the Council on Dental Education, appeared before the Subcommittee on Health of the Senate Committee on Labor and Public Welfare. Senator Lister Hill of Alabama is chairman of both the full Committee and the Subcommittee. Doctors Creig and Peterson urged the Subcommittee to include schools of dentistry and dental hygiene within S. 1323 and Part E of S. 434 as eligible recipients of the federal matching grants within those bills. S. 1323, the principal bill before the Committee, would authorize a system of grants to assist in the construction of new facilities and expansion of present facilities for schools of medicine. The Association witnesses urged that a five year, 50 million dollar, matching grant program be included for schools of dentistry and dental hygiene. The text of the statements presented by Doctors Creig and Peterson follows.

The progressively increased demand for dental care coupled with the rapid growth of this nation's population make it imperative that the supply of dentists and dental auxiliary personnel keep pace with that demand and growth. The dental deans and administrators, in our opinion, have made commendable efforts, particularly during the last ten years, to increase the number of dentists and dental hygienists. Since 1944, for example, the number of dental schools has increased from 39 to the present 43, an increase of 10 per cent. More spectacularly, dental school enrollment has increased from 8,590 in 1944 to 12,601 in 1954, a 47 per cent increase; during that same period, the number of dental graduates has increased from 2,470 to 3,084, a 25 per cent increase.

In addition, the number of schools of dental hygiene has increased from 14 in 1946 to 31 in 1955, an increase of 121 per cent. Dental hygiene enrollment has increased proportionately; the number of dental hygiene graduates, moreover, has increased from 399 in 1946 to 850 in 1955, an increase of 103 per cent. The dental hygienist has become one of the most important auxiliaries to the dental profession. She relieves the dentist of essential, but time-consuming, procedures. She enables her dentist-employer to concentrate his time and

efforts on procedures which require his more specialized skills. The dental hygienist, by performing her main function, oral prophylaxis, makes it possible for more people to receive that important preventive service regularly. The dentist who employs a dental hygienist is able to see more patients and, therefore, is in a position to offer complete dental care to more people. Although funds for the construction and expansion needs of dental schools are most urgently needed, it would be desirable to make schools of dental hygiene eligible for the cost of instruction grants which this Committee is considering.

The policy-making body of the American Dental Association, the House of Delegates, declared its support of federal grants for dental educational programs in 1949. That policy declares:

"*Resolved,* that the American Dental Association approve the policy that federal funds, with justification, might be appropriated in support of dental educational programs, provided that such funds when appropriated should be accepted only with the understanding that the government shall not exercise any control over, or prescribe any requirements with respect to, the curriculum, teaching personnel, or administration of any school or the admission of applicants thereto."

In 1950, the American Dental Association supported H.R. 5940 and S. 1453, 81st Congress. Those bills would have established a grant program for schools of dentistry and dental hygiene similar to the programs proposed by S. 1323 and Part E of S. 434 for schools of medicine. In 1951, the American Dental Association offered its support for S. 337, 82nd Congress. That bill also included grants to schools of dentistry and dental hygiene for costs of instruction and for construction and improvement of educational facilities.

S. 1323

S. 1323, in substance, would establish a five-year 250 million dollar program of grants on a matching basis for medical schools to assist them in the construction of new buildings and in the expansion, remodeling and alteration of existing facilities. S. 1323 contains the safeguards against federal interference with school administration policies as recommended by the American Dental Association. The Association urges this Committee to extend the grant authority contained in S. 1323 so that schools of dentistry may receive sorely needed funds for expansion and improvement of their facilities and equipment and for construction of new facilities.

Congressman John E. Fogarty, a member of the House of Representatives from Rhode Island, has introduced a bill, H.R. 4667, which is a counterpart of S.1323 as far as medical education grants are concerned. That bill, however, would establish a separate grant program for dental schools. Mr. Fogarty's bill would authorize a five-year 50 million dollar matching grant program for schools of dentistry. The grants for dental schools would, under H.R. 4667, be available for construction and expansion of dental school facilities in the same manner and under the same conditions proposed by S. 1323 for medical school grants. We recommend that this Committee extend the grant authority proposed by S. 1323 to include schools of dentistry in the manner and in the amount suggested by H.R. 4667, 84th Congress, which is now before the Committee on Interstate and Foreign Commerce of the House of Representatives. We also recommend that the agency which would be created by S. 1323 to assist the Public Health Service Surgeon General in administering the grant program be named the "Council on Medical and Dental Educational Facilities" and that the "Council" include appropriate dental representation. Again, the Association's recommendations are in accord with the pertinent language of H.R. 4667.

PART E OF S. 434

Part E of S. 434 would establish two distinct types of grants to be made available to schools of medicine and schools of nursing education. The first type of grant is designed to help schools of medicine and nursing meet the cost of instruction and other operating costs. The second type would help those schools meet the cost of new construction and expansion of existing facilities. The construction and expansion grants would be provided on a matching basis. The cost of instruction grants would be based upon the number of enrolled students, with a bonus for increases in enrollment.

The American Dental Association has in the past supported a similar system for assisting schools of dentistry and dental hygiene to meet their sharply increasing costs of instruction and operation. A survey of the financial status and needs of dental schools, sponsored by the Public Health Service in 1952, revealed that the median basic operating expense per student for all forty dental schools surveyed was $1,316 for the school year 1949-50. That amount was at least $800 more than the median of tuition charges (about $500) assessed by the reporting schools during the same school year. At least that differential between operating expense per student and

the tuition he pays prevails on the average today. The Public Health Service survey also disclosed that the median basic operating expense per student in schools of dental hygiene affiliated with dental schools amounted to $525 for the school year 1949-50. That amount was about $200 more than the median of tuition charges (about $300) assessed by those schools during 1949-50. Again, at least that differential between operating expense per student and tuition paid by the student prevails on the average today.

The American Dental Association recommends that this Committee extend the cost of instruction grants as proposed by Part E of S. 434 to include schools of dentistry under the system and in the same amounts proposed for schools of medicine. The Association also recommends that this Committee include schools of dental hygiene within the cost of instruction grants under the system and in the same amounts proposed for schools of nursing which provide basic or advanced training leading to a degree in nursing. Our position on grants for construction and expansion of dental school facilities has already been expressed; we urge this Committee to support the program of construction and expansion grants for dental schools proposed within H.R. 4667, 84th Congress.

In order that the Committee may have the most expert testimony on the present and future financial needs of the dental schools, I shall ask Dr. Shailer Peterson, the secretary of the Association's Council on Dental Education, to present that material. Dr. Peterson is a specialist in the field of education, having obtained his doctorate in that field. His long experience with the Council on Dental Education of the Association has established him as a recognized leader in the field of dental education.

DR. PETERSON'S STATEMENT ON FINANCIAL NEEDS OF THE DENTAL SCHOOLS

At the outset I would like to assure this Committee that the American Dental Association through its Council on Dental Education will continue to cooperate with the state dental societies, state governments, regional groups and private groups which are interested in establishing new schools of dentistry and dental hygiene. I can report that three new dental schools will begin admitting students in the next 18 months. Two will be located in New Jersey and one in West Virginia. Within the next 24 months we expect a fourth school to be started. We can anticipate that by 1961 the number of graduating dentists will have increased from the 1954 total of 3,084 to 3,319, an increase of almost 8 per cent. That also represents an increase of 34 per cent over the 1944 total of dental graduates. In addition, five new dental hygiene schools are expected to be in operation within the next two years, and perhaps 39 will graduate classes by 1961. This could increase the number of dental hygiene graduates to about 1,014, an increase of 31 per cent over the 1954 number. There appears to be an adequate supply of qualified applicants for both dental and dental hygiene training. Every reasonable effort will be made to make places available in the schools for those who apply and meet the qualifications.

I shall devote the remainder of my presentation to an evaluation of the present and future financial needs of the schools of dentistry and dental hygiene. The staff of the Council on Dental Education recently conducted a survey of past expenditures and the immediate financial needs of the dental schools. That survey discloses that the schools have spent over 40 million dollars during the last five years for new buildings, for remodeling and expansion of buildings, for new equipment, and for replacing and repairing equipment. About 75 per cent of the 40 million dollars was spent for new buildings. All of the past expenditures reported were made by the schools out of their own resources; to our knowledge no outside assistance was provided. During that five year period, the number of students graduated from the dental schools increased from 2,565 to 3,084, an increase of 20 per cent.

The dental schools also reported their need for additional funds for construction of new buildings, for expansion and remodeling of existing facilities, for new equipment, and for replacing and repairing present equipment. The schools reported that they had an immediate need for 40 million dollars in additional funds. It should be emphasized that most of the schools based their estimates on their needs for the next year, rather than for a five or ten year period. It should be kept in mind too that the estimates were given without any knowledge that outside financial assistance might be available. Despite the conservative

estimates of construction, expansion, and equipment needs, the survey discloses that the dental schools could expect to enroll 314 additional applicants if those minimum needs were met.

As you are no doubt aware, the Council on Dental Education serves as the official accrediting agency for the dental schools. In my capacity as secretary to the Council I have visited all of the dental schools and am aware of their long-range needs. Nine of the schools have physical plants which are reasonably adequate; they do, however, require some minor expansion of physical facilities and additional equipment. Three schools have modern plants but require additional facilities to provide for their present enrollment and for the increased enrollment which they wish to make possible. The remaining 31 of the 43 schools need considerable funds for new buildings to modernize their total facilities. Conservatively, it can be estimated that each of the 31 schools requiring new buildings will need about 1.5 million dollars to modernize its facilities. Each of the three schools which must expand its present facilities needs one million dollars or thereabouts. Additional equipment needs for all 43 schools would amount to about ten million dollars. The 43 dental schools now in operation, therefore, need at least 60 million dollars during the next five years.

If you will recall, I mentioned that four new dental schools will be accepting students within the next 18 months or two years. A minimum estimate of their financial requirements for buildings and equipment would be ten million dollars.

The additions needed for the several new dental hygiene facilities would probably require an additional three to five million dollars, depending, of course, on the size of classes and the actual number of schools that will be opening within the next five year period.

It is reasonable to expect that a source of federal grants will bring forth the necessary matching funds not now available. It may likewise stimulate a further increase in the number of new schools of dentistry and dental hygiene. The feasibility of establishing schools of dentistry in Colorado and South Carolina has been given intensive study and consideration. A regional dental school for the New England area has been proposed and has received strong support. It would be well, then, for this Committee to consider making provision for new dental schools other than the four which are certain to open within the next few years; 20 million dollars might eventually be required for additional new schools.

I wish to assure the Committee that the approximately one-hundred million dollar estimate of funds needed to support our dental educational program over the next five year period is conservative. I believe it is imperative that the schools of dentistry continue to improve their programs. That means, of course, that the schools must have the best available facilities and equipment. I would like to stress, for example, the serious need for additional research facilities and equipment in the dental schools. Research is a highly important part of the dental school curriculum; it is an essential discipline for the practicing dentist as well as for the teachers and dental scientists which the dental schools must supply.

In behalf of the American Dental Association I wish to thank the Committee for the opportunity to express the Association's position on this important legislation.

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

Survey of dental graduates
III. Time elapsing between graduation and start of practice; factors in choice of practice location

Among the dentists in private practice who participated in this survey, 23.0 per cent were licensed to practice during the month they graduated, and 94.8 per cent had obtained licenses within three months of graduation (Table 14). This appears to indicate that there is no serious loss of dental manpower occasioned by delay in obtaining licenses.

About one third (32.6 per cent) of the respondents reported going into practice the same month as they obtained their licenses (Table 14). An interval of one month was reported by 24.5 per cent, two months by 12.8 per cent, and three months by 6.4 per cent. The remaining 23.7 per cent reported intervals of up to 40 months between licensure and start of practice.

This survey included graduates of the years 1951 through 1954. In studying the intervals between graduation and licensure and between licensure and start of practice, it should be remembered that during this period many graduating dentists were required to serve in the Armed Forces immediately after graduation. At the time of the survey in November 1954,

Table 14 • Percentage distribution of dentists by number of months elapsing between graduation and licensure and between licensure and start of private practice, according to year of graduation

Number of months elapsing	Between graduation and licensure					Between licensure and start of practice				
	1951 graduates	1952 graduates	1953 graduates	1954 graduates	Total	1951 graduates	1952 graduates	1953 graduates	1954 graduates	Total
0	20.0	19.8	23.4	36.6	23.0	35.7	34.8	28.1	29.4	32.6
1	33.1	31.9	38.4	33.0	34.1	18.4	23.0	27.6	35.3	24.5
2	32.9	30.8	22.9	22.6	28.3	11.1	10.6	14.8	17.8	12.8
3	8.5	10.5	10.5	7.3	9.4	6.0	5.6	6.0	9.8	6.4
4	3.1	3.5	1.8	.5	2.5	2.2	2.2	4.5	3.7	3.0
5	.4	1.2	1.1	—	.8	1.5	2.0	2.0	2.4	1.9
6	.4	.4	.3	—	.3	1.0	1.5	2.0	1.0	1.4
7	.1	.3	.3	—	.2	.7	1.2	.6	.3	.8
8	.2	.0	.0	—	.1	1.5	.6	1.3	.3	1.0
9	.0	.3	.3	—	.2	.6	1.6	1.9	—	1.1
10-	.2	.1	.0	—	.1	.6	.9	1.6	—	.9
11-13	.7	.4	.6	—	.5	3.3	4.5	5.9	—	3.9
14-16	.0	.4	.4	—	.3	3.5	2.2	3.0	—	2.5
17-19	.0	.1	—	—	.0	2.7	2.7	.6	—	1.8
20-22	.0	.1	—	—	.0	1.6	1.9	.1	—	1.1
23-25	.4	.1	—	—	.2	4.0	3.1	—	—	2.1
26-28	.0	.1	—	—	.0	1.9	1.3	—	—	1.0
29-31	—	—	—	—	—	.9	.3	—	—	.3
32-34	—	—	—	—	—	1.0	—	—	—	.3
35-37	—	—	—	—	—	.2	—	—	—	.1
38 and over	—	—	—	—	—	1.6	—	—	—	.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean number of months	1.6	1.7	1.5	1.0	1.5	5.6	4.2	2.9	1.4	3.9

Table 15 • Percentage distribution of dentists by number of months elapsing between graduation and start of private practice, according to year of graduation

Number of months elapsing	1951 graduates	1952 graduates	1953 graduates	1954 graduates	Total
0	2.1	2.9	1.7	3.7	2.5
1	16.0	17.9	22.4	27.2	19.7
2	26.0	24.1	22.1	28.8	24.8
3	16.0	17.8	17.5	21.2	17.7
4	7.9	8.4	8.8	10.6	8.7
5	2.9	3.3	4.6	5.0	3.7
6	1.5	1.2	2.7	2.9	1.9
7	1.7	1.8	2.1	.3	1.6
8	.9	1.3	2.0	.3	1.2
9	1.0	1.1	1.4	—	1.0
10	1.4	1.1	1.6	—	1.1
11-13	3.9	3.9	7.1	—	4.2
14-16	3.9	3.8	4.3	—	3.5
17-19	2.2	2.9	1.6	—	2.0
20-22	1.4	2.0	.1	—	1.1
23-25	4.2	3.3	—	—	2.3
26-28	2.7	2.0	—	—	1.4
29-31	1.2	1.2	—	—	.8
32-34	.9	—	—	—	.2
35-37	.5	—	—	—	.1
38 and over	1.7	—	—	—	.5
Total	100.0	100.0	100.0	100.0	100.0
Mean number of months	7.2	5.9	4.4	2.4	5.4

almost all of the 1951 graduates and some of the 1952 graduates who had gone into service had been released. Dentists who had graduated in 1953 and 1954 who entered the Armed Forces were still in the service at the time of the survey and therefore were not included.

Perhaps the most realistic figures on these intervals are those for the 1951 graduates, who had had sufficient time to serve their tours of duty in the Armed Forces. The 1951 graduates averaged 1.6 months between graduation and licensure and 5.6 months between licensure and start of practice, for a total of 7.2 months between graduation and opening of the office.

Table 15 shows the total number of months elapsing between graduation and start of practice, according to year of graduation. Again, the figures on the 1951 graduates are the most meaningful because enough time had elapsed for these dentists to have completed tours of duty in the Armed Forces after graduation.

From the data in Table 15 it is apparent that the majority (nearly two thirds)

Table 16 • Percentage distribution of replies to the question: "If more than six months elapsed between graduation and the date you began private practice, please state the reason for the delay."

Reply	Per cent
Internship, residency	24.1
Employed by another dentist	22.3
Military service	12.2
Waited for office space to become available —searched for location	11.7
Employed by Veterans Administration, government, industry, hospital or clinic	8.5
Advanced study (type of program not specified)	6.0
Delay in securing license (failed; waited for examination to be held; waited for results)	5.6
Employed as a teacher	4.4
Lacked funds to establish practice	2.3
Waited for construction of own building	1.5
Other	1.4
Total	100.0

of private practitioners enter practice within three months after graduation. The number entering practice during the fourth month after graduation is only about half the number entering practice the third month. Beyond the fourth month, there was a wide variation in the lengths of time reported. The table indicates that the "normal" situation is for the dentist to be in practice within three or, at most, four months after graduation.

The 21 per cent of the respondents who reported intervals of more than six months between graduation and start of practice were asked to indicate the reason for the delay (Table 16). About one fourth (24.1 per cent) had served as interns and residents before entering private practice. Also, 6.0 per cent had been engaged in advanced study other than internships or residencies. Nearly one fourth (22.3 per cent) stated they had been employed by another dentist

Table 17 • Percentage of respondents replying as indicated to the question: "What were the main reasons why you selected your present town as a location for your practice?"

Reply	Per cent
Need for dentist in town—ratio of population to number of dentists	42.9
Home town	32.7
Economic conditions of town good—stable community	18.6
Progressive	16.7
Near friends and relatives	14.1
Available office space—chance to rent desirable office	13.8
Liked size	11.9
Good recreational facilities—cultural interests	9.0
Near large city	8.4
Liked climate	7.7
Liked small town	7.5
Good place for children and family—living conditions good	6.7
Geographic location—centrally located—located near ocean, etc.	6.6
Chance to buy established practice	5.5
Good schools—close to college—college town	4.8
Low overhead—easier financing	4.5
Well known in community	4.2
Went into practice with father or wife's father or other members of family—took over practice from father or other members of family	3.8
High per capita income	3.7
Interest in dentistry—high standards of dentistry	3.4
Wanted to associate with other professional men in town—had chance for good partner	3.0
Near dental school	2.7
Friends or relatives in professions	2.5
Wife's home town	2.4
Appearance of town—clean town—new town	2.2
High fees	2.2
Liked large city	2.0
Friendliness and hospitality of people in town—liked people	2.0
Churches—religious reasons—racial reasons	1.9
Friendly attitude of other dentists in city—good dental society	1.9
Community facilities good—good Chamber of Commerce—good hospitals	1.6
High cultural level of people—high standards of living	1.5
Other physicians or dentists recommended town	1.3

for a period following graduation. Another 12.9 per cent had been employed in other salaried positions, including teaching and government positions.

Only 12.2 per cent of the dentists who reported intervals of more than six months between graduation and start of practice stated that the delay was caused by military service. This low figure is explained by the fact that the majority of dentists who graduated during the period 1951-1954 and went into service were still in service at the time that the survey of dental graduates was being made.

An effort was made in this survey to determine the factors that graduating dentists consider important in the choice of a city or town in which to practice. As shown in Tables 17 and 18, respondents were asked to indicate the main reasons for selecting the town in which they were practicing, and, if other towns were considered and rejected, the main reasons for the rejection.

The percentages given in Tables 17 and 18 are percentages of all private practitioners responding. Some dentists recorded more than one reason (as many as four), therefore percentages add to more than 100.0 per cent.

As could be expected, the factor mentioned most often in choice of a practice location was the need for a dentist, often expressed as the ratio of population to number of dentists. This was given as a reason for selection by 42.9 per cent of the respondents and a reason for rejection by 15.5 per cent.

About one third (32.7 per cent) of the respondents stated they had returned to their home towns to practice dentistry. In fact, a larger proportion (27.3 per cent) listed "home town" first on their list of reasons than any other reason. The need for dentists was first on the list of 16.5 per cent of the dentists. Nevertheless, as mentioned earlier, the total number of dentists who gave "need for a dentist" as a reason was greater than the number of dentists who listed "home town."

Table 18 • Percentage of respondents replying as indicated to the question: "Probably you considered other towns as a location for your practice. If so, were there specific characteristics of these towns that made you decide against them?"

Reply	Per cent
Additional dentists not needed	15.5
Unfavorable or unstable economic conditions—seasonal	11.6
Suitable office space unavailable	9.4
Too small a town	7.6
Size of town	6.4
Climate unsuitable	5.4
Too much investment needed—overhead too high	5.4
Unprogressive	5.3
Too large a city	5.0
Low fees	5.0
No recreational facilities—lack of cultural interests	3.6
Attitude of people toward dentistry—lack of interest in dentistry—low standards of dentistry	3.5
Geographic location	3.4
Too far from large city	3.0
Too far from family and friends	2.9
Poor place to raise children—poor living conditions—undesirable place for family	2.6
Churches—religious reasons—racial reasons	2.5
Too near friends and relatives—home town	2.4
Poor schools—no colleges	2.3
Unfriendliness of other dentists—fee cutting by other dentists	1.8
Poor appearance of town—dirty town	1.7
Low per capita income	1.7
Community facilities bad—no hospitals—Chamber of Commerce inactive	1.5
Real estate too expensive or unavailable—inadequate housing	1.2

The economic conditions of the town constituted another very important factor in the minds of dentists seeking locations. This factor ranked third among reasons for selecting towns and second among reasons for rejecting towns. In addition to the general economic level of the town, dentists often mentioned the factor of stability or freedom from seasonal fluctuations in economic activity.

Other important factors in choice of a town included availability of office

space, size of the town, climate, cultural and recreational facilities, and the progressiveness of the town.

This is the final article of the series on the Survey of Recent Dental Graduates. Reprints of the three articles, the first two of which appeared in the April and May issues of THE JOURNAL, are available on request to the Bureau approximately six weeks after publication in THE JOURNAL.

B. Duane Moen, Director

BUREAU OF LIBRARY AND INDEXING SERVICE

The American Dental Association Film Library

The following films are available from the Film Library at a nominal rental fee of $2.50 to dental societies, study clubs, dental schools, hospital dental staffs, and armed services dental personnel. Since the number of prints of each title is necessarily limited, it is suggested that program chairmen plan their programs far enough in advance to insure availability.

The film, "Hazards of Dental Radiography," received second prize at the International Film Festival in Venice in 1954 and a recognition of merit at the Second American Film Assembly held in New York in April 1955. In addition, the film, "Wisconsin Cleft Palate Story," won a Golden Reel award in the education category of the Second American Film Assembly.

FILM REVIEWS

Hazards of Dental Radiography • 16 mm., sound, 13 minutes. Produced in 1953 by the National Bureau of Standards and the Council on Dental Research of the American Dental Association. The film can be purchased ($62.59) from the Office of Scientific Publications, National Bureau of Standards, Washington 25, D. C., and loaned ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago 11, or from the National Bureau of Standards.

This film illustrates the elementary physics involved in dental roentgenography, shows actual roentgenographic procedures in the dental office and points out the radiation hazards involved in the use of roentgen ray radiation by the dentist. Each incorrect procedure is followed by the correct procedure. The recommendations made are based on those outlined in the *National Bureau of Standards Handbook 41,* which is available from the Office of Scientific Publications, Washington 25, D. C.

The film is well organized and is suitable for dental society program material and for inclusion in the roentgenology course in the dental school. The photography is good. It is also recommended for use by hospital dental staffs and Armed Forces personnel. The film might have been strengthened if pathologists and specialists in the physical sciences had reviewed the material covered so that the organic effects could receive full consideration.

Wisconsin Cleft Palate Story • 16 mm., color, sound, 1,296 ft., 36 minutes. Produced by the University of Wisconsin Photographic Laboratory for the Bureau of Handicapped Children. Photography by Walter Meives. Film can be purchased ($180) from the University of Wisconsin Photographic Laboratory, 1204 W. Johnson St., Madison 6, Wis. Procurable on rental ($2.50) from the American Dental

Association Film Library, 222 E. Superior St., Chicago, and for rental ($5) from the University of Wisconsin Photographic Laboratory.

The purpose of this film is to acquaint the public with the integrated services desirable for a child with a cleft palate and to show the close cooperation among the medical, dental and health professions in the treatment of such a handicap.

The film opens by showing a six year old boy with a cleft palate, and the effect of this handicap on his personality. There is then a flashback to the parents at the birth of this child which shows the attending physician informing them that their child has a bilateral cleft lip and palate. This defect is compared in photographs with the lip and palate of a normal child and is further explained by animated drawings. How this case comes to the attention of the Bureau of Handicapped Children is then depicted. A cephalometric diagnosis is made and the procedure in the correction of the cleft lip is then demonstrated.

In the first operation only one side is repaired; in the second operation, performed six weeks later, the other side is repaired. The intraoral operation does not take place until 18 or 24 months later. This same child, seen one year later, appears to be husky.

The manner in which the dentist approaches the child is shown. The prosthodontist uses models to illustrate to the patient and parents the prosthetic appliance. Its design and preparation is indicated but not demonstrated. How this appliance, when inserted, improves the child's speech and assists him in chewing and swallowing is portrayed. This sequence concludes with the dentist teaching the child how to remove and replace the appliance himself.

The next step is an early evaluation of the orthodontic work needed, since early treatment may be imperative. A teen-age patient who has had this treatment and who has been attending the orthodontist for an adjustment every three weeks is shown. He is also given instructions in toothbrushing. The orthodontist keeps a careful check on the movement of the teeth. This concludes the discussion of the dentist's role in the habilitation of the cleft palate patient. The rest of the film shows the formal speech training in the summer speech training center to which cleft palate children from the ages of 5 to 8 years come. How the teacher and the speech teacher cooperate and how the children practice palatal exercises are demonstrated. The film concludes with a review of the teamwork achieved in the treatment of the cleft palate child.

The film is well organized. The photography is good. It is suitable for showing before nonprofessional audiences, dental schools and dental societies. It will be especially interesting to orthodontists, prosthodontists and speech therapists.

COUNCIL ON DENTAL RESEARCH

Deletion from list of certified dental materials

The Fellowship Division, National Bureau of Standards, of the Council on Dental Research, American Dental Association, has been notified by the manufacturer of the subject alloy that it is no longer being manufactured and should be removed from the List of Certified Dental Materials.

CERTIFIED AMALGAM ALLOYS (A.D.A. SPECIFICATION NO. 1)

Alloy	*Manufacturer or distributor*
Argentum Shavings	Hammond Dental Mfg. Co.

Revision of list of certified dental materials

Samples of the Certified Inlay Casting Investments were recently retested by the American Dental Association Research Fellowship at the National Bureau of Standards under the supervision of that Bureau. These materials were found to comply with American Dental Association Specification No. 2 for Inlay Casting Investments. This list supersedes that published in the February 1955 issue of THE JOURNAL.

CERTIFIED INLAY CASTING INVESTMENTS
(A.D.A. SPECIFICATION NO. 2)

Investment	*Manufacturer or distributor*
Baker Cristobalite	Baker & Co., Inc.
Beauty-Cast	Whip-Mix Corp., Inc.
Kerr Cristobalite-Inlay	Kerr Mfg. Co.
Ransom and Randolph Gray	The Ransom & Randolph Co.
Steele's-Super	The Ransom & Randolph Co.

JULY 1955

LON W. MORREY, D.D.S., EDITOR
VOLUME 51 • NUMBER 1
Published by the American Dental Association
222 East Superior Street • Chicago 11, Illinois

THE Journal OF THE AMERICAN DENTAL ASSOCIATION

Editorials

Today's dental graduate: his heritage and responsibilities

The number of new dentists added to the nation's dental population reaches a new high this year according to the latest estimates of the Council on Dental Education of the Association. Slightly less than 3,100 dentists were currently graduated by the nation's 43 dental schools; slightly more than were granted diplomas in 1954 and almost double the average number graduated annually during the thirties and early forties.

The nineteen fifty-five graduates will have no difficulty in becoming an integral part of their profession, their dental society and their community, as all will greet them warmly. Today's graduates are to be congratulated on their good judgment in selecting dentistry for their life work and on their good fortune in entering the profession at this particular time. Never has dentistry offered the young dentists greater opportunities. Every trend indicates that the next twenty-five years will be the most dynamic and gratifying in the history of the profession. Tremendous improvements have taken place in all branches of dentistry during the past half century, and the young men and women who stand on the threshold of the profession are the beneficiaries of these improvements. They have inherited these benefits from the long line of dentists who have gone before them. It is their obligation to improve upon these improvements for the benefit of those whom they will serve, and the number they will be called upon to serve will be great. Barring a national catastrophe, it will grow

greater each succeeding year. It will grow greater because of the rapid increase in the nation's population and the equally rapid increase in the nation's appreciation of dental services.

On the twenty-seventh of last May the nation's population reached an estimated one hundred and sixty-five million persons, fourteen million more than in 1950 and forty-two million more than in 1930. More than four million babies were born in the United States in 1954, topping the record set in 1947. The death rate for last year was approximately 9.2 per thousand population, a substantial drop from the rates of 9.6 and 9.7 which have prevailed over the last five years. With more than four million births, some immigration and only one and one half million deaths, the population of America increased last year alone by almost three million. Two hundred and twenty million Americans are in prospect for 1975—less than one short generation in the future.

This rapid rise in population alone will tax the strength and resources of the dentist of tomorrow. His strength and resources will be taxed additionally by the increased demands for dentistry brought about by community dental health education programs, initiated by the Association during the early years of this century and since improved and implemented by every state and local dental society, department of health and board of education in every town and county in the country.

Never in the history of American dentistry has the initiate been faced with greater opportunities and never before has he been better prepared to grasp them. The profession rightfully can be proud of the heritage it bequeaths him and hopefully anticipate that he will build and improve upon it.

Research: the principal key to prevention of dental disease

The Hoover Commission, early last month, took to task the United States Department of Health, Education and Welfare for its inadequate support of medical research. Specifically it criticized the department for allowing a backlog of seven hundred and twenty-three important research projects totaling some seven and one half million dollars to lie dormant in the National Institutes of Health. Included among them is a modest number of projects in dental research. Apparently none will be activated this year as the department has not requested funds for that purpose. Why all these particular projects, including the dental projects, failed to elicit the department's interest remains a mystery. Perhaps the Hoover Commission has as good an answer as any:[1] "We are concerned over the apparent failure of the Executive Branch to indicate these 'backlog' projects to the Congress. . . . Possibly this results from the belief that Congress will be more receptive to requests for funds devoted to projects likely to produce startling and dramatic results."

To most people, including the nation's lawmakers, the prevention of dental caries is not dramatic. Yet the question well may be asked, What public health measure—the product of scientific research—in recent years has produced more substantial

benefits for large groups of children than has the fluoridation of public drinking water? Dentistry is convinced that what its researchers have accomplished with limited funds and facilities in the field of dental caries they can also accomplish in other phases of dental disease if sufficient funds and adequate facilities are placed at their disposal.

To that end each year for several years past representatives of the Association have appeared before the appropriate committees of Congress and requested an increase in funds for dental research. This year the Association requested that the appropriation for dental health and research activities of the National Institute of Dental Research be increased from $421,000 to $1,000,000 for dental research grants and from $100,000 to $250,000 for fellowship awards for training individuals in dental research—a modest request in view of the nation's forty-three dental schools and numerous other institutions willing and able to conduct investigations of various dental problems.

Favorable congressional action on the Association's recommendations—which on June 15 was still forthcoming—will enable the Institute to double its dental research activities—a much desired goal and one worthy of attainment if for no other than for economic reasons. As the Task Force on Federal Medical Services[2] pointed out last February: "Prevalence of dental disease among the people of this country, coupled with the short supply of dental manpower, makes important a preventive approach to dental care. In the field of dentistry, the main key to prevention is research. At present the Federal Government spends about 50 times as much for outpatient dental care ($93 million in fiscal year 1954) as it does on dental research ($1.8 million in the same year). If we are to discover methods of preventing dental disease, it is essential that the small nucleus of qualified research workers now in the dental field be retained, encouraged and expanded."

Dental disease, though not dramatic, constitutes an enormous economic drain upon society as the nation's estimated dental bill for 1954 was more than a billion and a quarter dollars. For that reason alone the Association's insistence on additional funds for dental research is more than justified.

1. Washington, D. C., Post and Times Herald, June 1.

2. Report on federal medical services, prepared for the Commission on Organization of the Executive Branch of the Government by the Task Force on Federal Medical Services, February 1955, Washington, D. C., Government Printing Office, p. 68, 69.

Washington News Letter

Because of the extended controversy over the Salk vaccine for poliomyelitis, the Administration and leaders in Congress have virtually abandoned efforts for enactment of any major health legislation.

Many bills in which the dental profession has an important stake, such as construction aid for dental schools, increased support of dental research and amendments to the social security act, appear certain to be shelved for this year. Yet there is an even greater likelihood that they will be brought up again in 1956, a national election year, when their political potentialities will be enhanced.

LABORATORY FAIR PRACTICES CODE

On June 7 the Federal Trade Commission promulgated a code of proposed trade practice rules for the commercial dental laboratory industry. At the same time, it scheduled open hearings on the code to be held in Washington June 24.

The rules, which have not been approved by the Commission and whose final form will undoubtedly be influenced by testimony scheduled to be presented at the June 24 hearing, define the commercial dental laboratory industry as follows:

> Members of the industry are those persons, firms, corporations, and organizations engaged in the design, formulation and fabrication under written or oral authority, and/or from impressions, casts, or models, of a licensed practitioner of dentistry, a licensed medical physician, or other authorized person, of orthodontic corrective appliances, prosthetic dental appliances, ceramic or plastic teeth encapments, cast-metal dental appliances, dental inlays, dental bridges, and other types of oral restorations.

The proposed rules, as issued in their preliminary form on June 7, lay down the following prohibitions, among others:

Deceptive demonstrations and claims; unauthorized substitution of products; false disparagement of competitors' products; deceptive use of trade names and trade marks; offering of "free" items when such an offer is misleading; deceptive pricing; unethical brokerage and pricing practices.

In its recent report to Congress on business enterprises of the federal government, the Hoover Commission recommended abolition of all but a token number of the dental laboratories maintained by the military establishment and Veterans Administration.

Its investigators found and listed 381 government facilities for the manufacture and repair of medical and dental supplies and equipment. Of this total, 264 were engaged exclusively in dental work and ten were combined medical and dental repair shops. The Army, Navy and Air Force accounted for 250 of them: Army, 9; Navy, 75, and Air Force, 166. The Veterans Administration operated 20, and the remaining four were divided among the U.S. Public Health Service (two); the Bureau of Indian Affairs and the U.S. Coast Guard, one each.

The Hoover Commission stated that private industry has the ability and capacity to take over this work and recommended governmental discontinuance of these laboratories, "except those needed for training purposes, as mobilization reserve facilities, or in remote areas."

ARMY DENTAL CORPS ACTIVITIES

Maj. Gen. Oscar P. Snyder, chief of the Army Dental Corps, is scheduled to leave July 9 for an inspection tour of the Far East Command. He returned to Washington several weeks ago from a similar

visit of dental activities in the European Command. On that trip he was accompanied by Col. Joseph Bernier, of the Armed Forces Institute of Pathology, and Miles R. Markley, of Denver, who is consultant to the Fitzsimons Army Hospital.

On the Western European tour, General Snyder and his party spoke at meetings of military and civilian dentists in nine locations. The attendance and interest were highly gratifying, General Snyder stated. The theme of each conference was restoration and preservation of the individual tooth in the light of conditions which find Army inductees' mouths in the worst state since World War I.

General Snyder said also that discussion of dental services for dependents occupied a prominent place on the agenda of each meeting.

Shortly after his return to Washington, he presided over a two day meeting of dental education and training officers from Walter Reed and Brooke Army Medical Centers. Consideration was given to the entire range of advanced education and training, with particular attention to plans that are being drawn up for a course which will be instituted at Brooke for enlisted personnel.

International Correspondence

NEWS FROM GREAT BRITAIN

W. Stewart Ross writes that the Representative Board of the British Dental Association, at its meeting April 30, unanimously decided to instruct its delegates to the annual meeting of the Fédération Dentaire Internationale to vote for an increase in the membership subscription to the Fédération. The finance committee of the F.D.I. stated last year that an increase in the subscription was necessary if the Fédération was to continue to serve effectively the interests of world dentistry.

A report issued by the Medical Research Council of the United Kingdom entitled *The Effect of Sugar Supplements on Dental Caries in Children* was published May 6. Investigations, which have been in progress for two years, were carried out in three centers in England: London, Liverpool and Sheffield. A careful survey was made of the diet of children of different age groups residing full time in recognized institutions.

Approximately half the children were given extra quantities of sugar with their meals, while the remainder continued on a normal diet to serve as a control. The sugar supplement given to the first group was approximately double the amount given to the control group. The results of the investigation demonstrated that "relatively great differences in the total sugar content of the diets of children in institutions had no significant effect on the initiation or spread of dental caries in periods of one or two years." The investigators were the late J. D. King, May Mellanby, H. H. Stones and H. N. Green.

The investigation is important in corroborating the results of the investigation carried out at Vipeholm, Sweden, by Gustafsson and his coworkers.

Unfortunately, the observations were misinterpreted by the national press, and wide publicity was given in some papers to a statement that children could consume as many sweets and candies as they wished since it had been shown that they did not cause dental decay.

The British Dental Association, the British Society of Periodontology and other workers and organizations interested in oral hygiene and preventive dentistry took immediate steps to have these misleading statements refuted, and the fact that the indiscriminate eating of sweets between meals can cause harm to the teeth was reported in many papers on the next day and announced on the British Broadcasting Corporation network.

ROYAL COLLEGE OF SURGEONS

Sir E. Wilfred Fish, who has been appointed director of the new department of dental science at the Royal College of Surgeons, writes that preparations for the department are progressing rapidly. The new building will provide space for the director and two senior research fellows, with the necessary technical and secretarial assistance, as well as for three junior research Fellows. The junior Fellows, while assisting with the main research project, which is a long term exploration of collagen, will be learning research methods and will engage in minor research projects of their own. After a year or two with the College, these men will no doubt move on to other fields of scientific and educational activity. In this way the faculty will be performing its two main duties of postgraduate education and research.

Meanwhile, the appeal for additional funds has been launched, and a strong committee of some of the most eminent businessmen in this country has been set up under the chairmanship of Mr. W. W. F. Shepheard of Messrs. Turner and Newall. At the opening luncheon, in addition to a generous contribution from the chairman to cover the cost of the appeal, Mr. Huffam, a trustee of the Leverhulme Trust and chairman of Unilever, announced an offer by his Trust to contribute funds sufficient to pay the salaries of the research team for seven years. This generous move enables the director and his committee to proceed at once to search for two senior Fellows, a biochemist and a bacteriologist, and to send them for further training in their specialties. This training will be undertaken while the building is being put up, so that a real start can be made next year.

RESEARCH

The third annual meeting of the British division of the International Association for Dental Research was held at the London Hospital Medical College April 15 and 16, writes Prof. Martin Rushton. This division now has nearly

50 members. For the first time it was necessary to set aside a day and a half to allow for the 23 short papers which were read and discussed, and for the first time also a short session of demonstrations was provided.

These included histologic preparations of the innervations of dentin, electron microscope photographs, replica studies of deciduous enamel which were contributed by workers at the Royal Dental College at Copenhagen, statistical caries studies and continuous recording of parotid salivary flow. Among visitors were Sir Harold Himsworth, secretary of the Medical Research Council, and M. D. Appleman of the University of Southern California, who gave a paper on behalf of his group. The papers covered chemical, physical, histological, bacteriological, physiological and other investigations from 17 universities or institutes.

MANPOWER PROBLEM

The Interdepartmental Committee on Recruitment of the Ministry of Health is now studying the shortage of dental students in Great Britain. Prof. H. H. Stones believes the following are the most important causes of the shortage.

In the schools in which boys and girls receive their general education, the teacher responsible for giving advice about careers rarely points out the advantages of dentistry as a career.

Dentistry has not been presented to young people in an attractive manner. Their early visits to the dentist are tinged with apprehension. They believe that a dentist works all day in one room, filling or extracting teeth. They do not know about the many attractive and varied aspects of the profession. Consequently, they do not think it is likely to be a congenial life occupation. On the other hand, medicine and science have a romantic appeal to young people. To some medicine is attractive from the humanitarian aspect—the surgeon saving life. To others science opens up fascinating vistas of a subject of which they already have an elementary knowledge and about which so much is written in the newspapers and current literature.

The status of dentistry is different from that of the older profession of medicine, its chief competitor. In Great Britain a medical practitioner has a recognized position by virtue of his profession. The status of a dentist depends on the individual, and consequently each one has to achieve his position by personal effort. Hence a parent usually prefers that his son become a doctor.

It is a matter of conjecture whether the dentists as a whole are satisfied with their profession. If one dentist in every 10 years obtained one recruit, this approach alone would produce three times the present annual entry of dental students.

ITEMS OF INTEREST

The British Society of Periodontology held a successful clinical meeting at the Eastman Dental Hospital May 4. The program included table demonstrations, case reports of clinical interest, with the patients present for examination, and a film on occlusal equilibration lent by the United States Navy. Having the patients present has made these clinical meetings of great value.

The Metropolitan Branch of the British Dental Association held its midyear clinical meeting at University College Hospital May 4. Here again actual chairside demonstrations on patients proved of the greatest interest. There were also many table demonstrations, including "Nylon Dentures" by Mr. W. A. Mellish and "Silicates and Cavity Linings" by Capt. R. E. Going (DC) USAF. Captain Going proved to be a most able and popular clinician.

We have in Great Britain an oral hygiene service, sponsored by Messrs Gibbs, a subsidiary of Lever Bros. Their serious efforts to foster in the minds of the public a consciousness of the importance of teeth and the value of oral hygiene is worthy of mention. Recently they prepared a ten minute version of their film *Let's Keep Our Teeth* for showing every week throughout the summer before a potential audience of 300,000 adults at Holiday Camps.

Also through the medium of television, the importance of oral hygiene was stressed to child viewers of a program dealing with animals and their teeth. The May third issue of the *British Dental Journal* contains a reprint from the Chronical of the World Health Organization (1955. 9.1.) entitled "Dental Health," an abridged report of a World Health Organization consultant group. It is hoped that organized dentistry the world over will use this report as a blueprint for a sound dental health program.

Gerald H. Leatherman,
D.M.D., F.D.S.R.C.S.

Association Affairs

SENATE APPROVES ENLARGED DENTAL RESEARCH BUDGET

A joint conference committee of the House and Senate was at work in mid-June on the budget of the U.S. Public Health Service. In the budget was a House and Senate approved appropriation of $2,136,000 for the dental research and public health activities of the USPHS, an amount $146,000 more than that contained in the present budget.

APPROVE FUNDS FOR DENTAL SCHOOLS, CONGRESSMEN URGED

Federal aid to dental education was urged by Association representatives June 17 when Shailer Peterson, secretary of the Council on Dental Education, and Bernard J. Conway, secretary of the Council on Legislation, appeared before the House Committee on Interstate and Foreign Commerce. The committee was considering H.R. 4743, a bill to provide grants to medical schools for construction and expansion.

Dr. Peterson urged that the bill be extended to dental and dental hygiene schools. He proposed that a five year 50 million dollar matching grant program be set up for the dental schools.

"We can anticipate that by 1961 the number of graduating dentists will have increased from the 1954 total of 3,084 to 3,319, an increase of almost 8 per cent," Dr. Peterson said. "In addition, five new dental hygiene schools are expected to be in operation within the next two years, and perhaps 39 schools will graduate classes by 1961. Every reasonable effort should be made to make places available in the schools for those who apply and meet the qualifications," he declared.

A month earlier Association representatives testified on a companion bill, S. 1323, which is under consideration by the Senate Committee on Labor and Public Welfare.

MEASURE RESTRICTING VA CARE BECOMES LAW

A bill placing permanent restrictions on the Veterans Administration outpatient dental care program cleared both the houses of Congress and was signed by President Eisenhower June 16 as THE JOURNAL went to press. The measure contains restrictions recommended by the Association—a one year cut-off date from time of discharge for filing applications for treatment, actual proof of service-connection of the dental defect and limitation of treatment to a one time completion basis. The measure had previously cleared the House.

Passage of the legislation writes into law limitations already in effect in the VA, which had been carried out by administrative directive in the VA and by a "rider" attached to the VA budget.

CONFERENCE COMMITTEE VOTES COMPROMISE DRAFT BILL

A conference committee of the House and Senate June 21 reported out a compromise version of the controversial doctor draft law and sent it back to the two houses of Congress where passage was virtually assured. The compromise measure provides that 45 shall be the maxi-

mum age at which men may be called under the special draft.

The 45 year age ceiling was agreed on as the committee considered a Senate-passed measure providing for a 51 year age ceiling. It was reported unofficially that House conferees had proposed the maximum be set at 40.

The compromise measure extends the physician-dentist draft law for a period of two more years. Extended for four years is the $100 monthly equalization pay which has been supported by organized dentistry.

Earlier in the month, on June 9, American Dental Association representatives had offered the Senate Armed Services Committee an amendment to the special draft designed to end military liability for all dentists except nonveterans below the age of 35. In offering the amendment, J. Claude Earnest, vice-chairman of the Council on Legislation, scored the "sheer waste of dental manpower" by the Department of Defense and stated that all reasonable dental needs of the military could be met without recourse to a special draft law.

Other action also was taken on the draft. Late in May, in a telegram to dental members of state advisory committees to Selective Service, Howard Rusk, M.D., chairman of the Health Resources Advisory Committee of the Office of Defense Mobilization, instructed the dental members to review the status of all dentists over 40 who had been commissioned but had not yet entered active duty.

The telegram said, "In view of availability of new graduates soon, request immediate review on basis of essentiality of dentists on call number 24 [the March call] age 40 and over desiring delay in call to duty. Wire names, addresses, and service in which commissioned or to which application has been made to Dr. Barton immediately." Dr. Barton is executive secretary of the Health Resources Advisory Committee.

DELEGATES SELECTED FOR F.D.I. AUGUST MEETING

Six dentists have been chosen to represent the American profession at the August 14-20 meeting of the Fédération Dentaire Internationale in Copenhagen, Denmark, according to Daniel F. Lynch, Association president. The delegates are LeRoy M. Ennis of Philadelphia; Leslie M. FitzGerald of Dubuque, Iowa; Marvin E. Kennebeck of the District of Columbia; Harry Lyons of Richmond, Va., and Harold Hillenbrand of Chicago. Gerald L. St. Marie of West Haven, Conn., will serve as alternate. Dr. Hillenbrand is chairman of the group.

RELEASE NEW NBS FILM ON DENTAL MATERIALS

A new film produced at the National Bureau of Standards in cooperation with the American Dental Association has been released. *Dental Materials: Specifications and Certification* is a color and sound production about 12 minutes in length. It shows the dental research section of the National Bureau of Standards at work and explains how materials are tested to see if they comply with specifications. The film shows the meticulous care used in their testing. It is available now from the NBS in Washington and will be available from the Central Office in July.

IT'S THE BRUSHING THAT COUNTS—HEALTH WEEK THEME

Oral hygiene will get a boost as Children's Dental Health Week posters bearing the legend "It's the Brushing that Counts" are distributed to the nation's dental societies in the coming months. Posters for the 1956 observance will be available early in July from the Bureau of Public Information at the Central Office in Chicago. Portfolios of other

promotional material will be ready later in July. The 1956 celebration dates are February 5-11. As the initial step in preparing for the observance, questionnaires were sent in June to secretaries of state dental societies requesting the names of officials in charge of the program in each state.

HAWAII APPROVES USE OF NATIONAL BOARD GRADES

Governor King of the Territory of Hawaii has signed into law a bill making possible acceptance of the certificates of the National Board of Dental Examiners as partial fulfillment of the Territory's requirements for the practice of dentistry, according to an announcement made June 1 by H. L. Houvener, secretary of the Territorial Board of Dental Examiners. In addition to the National Board examination and the Territory's clinical examination, a year's residence prior to practice is required of applicants, Dr. Houvener said.

DENTAL MATERIALS HANDBOOK AVAILABLE FROM ASSOCIATION

A new comprehensive handbook entitled *A.D.A. Specifications for Dental Materials* is now available from the Central Office. The manual, published by the Council on Dental Research, deals with the work of the Association Research Fellowship at the National Bureau of Standards and provides in ready-reference form technical information on the specification and certification program of the Council on Dental Research.

The handbook contains all 12 of the Association's specifications for dental materials. It lists certified dental materials, contains a bibliography of motion pictures on dental research at the National Bureau of Standards and NBS publications. In addition, the proper handling of dental materials is discussed.

The manual was prepared by George C. Paffenbarger, senior research associate of the American Dental Association at the National Bureau of Standards and Mr. W. T. Sweeney, chief, Dental Research Section of the National Bureau of Standards. It will be revised annually, will prove useful to the practicing dentist, the dental schools, dental research laboratories and manufacturers, according to H. Trendley Dean, Council secretary.

LIFE MEMBERSHIPS TO BE ACTED ON AT ANNUAL SESSION

Applications for life membership will be voted on at the Association's 96th annual session October 17-20 in San Francisco. In order for applications to be considered at that time, they must be received in the Central Office by August 17, according to Louis M. Cruttenden, Association assistant secretary.

KINESCOPES REQUESTED FOR USE AT ANNUAL SESSION

Dental societies, dental schools and government agencies that produced kinescopes on dentistry in 1955 are requested to contact Helaine Levin, Association film librarian. (A kinescope is a film record of a live TV program.) The showing of a group of films specifically made for television is being considered for the Association's annual session in San Francisco in October.

COUNCILS, DELEGATES TO MEET IN SAN FRANCISCO

The various agencies of the Association and the delegates from the trustee districts will hold meetings at the time of the Association's 96th annual session October 17-20 in San Francisco.

A dental health conference, sponsored by the Council on Dental Health will be

Delegates to the Association's 96th annual session in San Francisco October 17-20 will see scenes such as this one. San Francisco's skyline provides the background for the Bay Bridge viewed from the Oakland side.

held at the Mark Hopkins Hotel. The luncheon for international guests, sponsored by the Council on International Relations, is scheduled for the Fairmont Hotel, and a dental journalism conference, sponsored jointly by the American Association of Dental Editors and the Council on Journalism is also set for the Fairmont Hotel. These three meetings will be held October 15.

In addition, a State Society Officers Conference is planned. It will be held October 16 at the Mark Hopkins. The Council on Legislation will meet with the members of its liaison committee October 17 and 18 at the Fairmont and the Council on Relief will meet with its liaison officers October 17 and 19 also at the Fairmont. Trustee district meetings will be held at the Fairmont and the Mark Hopkins.

EXPAND MATERIAL ON ANTIFLUORIDATIONISTS

Comments on the Opponents of Fluoridation, a mimeographed compilation of information on those opposing the health measure, was revised and expanded by the Bureau of Public Information in June. Information is provided on such persons and organizations as the *Americanism Bulletin,* Royal Lee, Charles Eliot Perkins and *Prevention Magazine.* Copies may be obtained from the Bureau at the Central Office.

COUNCIL TO DEVELOP ADVERTISING RATE BOOK

A program designed to increase the advertising income of state dental journals will soon be underway as a result of action taken at the Council on Journalism meeting in Allerton Park, Ill., June 12. The Council voted to develop an advertising rate and data publication, containing the information needed by advertising space buyers interested in state journals. The book will be sent to the more than 400 manufacturers and advertising agencies on the American Dental Association mailing list. The action of the Council was concurred in by the editors attending the Journalism Conference June 13 and 14.

In explaining the proposal, John J. Hollister, Association business manager, pointed out that the development of such a publication would facilitate buy-

ing by potential advertisers as information on advertising space rates in dental journals from all over the country would be compiled in one book.

The increased standardization of journal page sizes in recent years, he said, has made possible the use of the same advertising plate size in all of the journals, thus improving the opportunity of the journals to get national advertising accounts. The rate and data book is to be completed by September.

The Council voted also to make a survey of component publications similar to that made recently of state journals and to prepare an exhibit of the component journals for showing at the annual session in San Francisco.

Staff members of the Central Office, the Illinois Dental Journal and faculty from the University of Illinois participated in the Journalism Conference which followed the Council meeting. Methods of improving journal content and format were discussed as well as questions raised by the editors such as should an editor publish all letters written by society members, must an editor express only the official policy of his association, should "personal" news be included, and how does an editor reject a manuscript in a tactful way. The next conference will be held in June 1956.

Presiding at the Conference sessions were William L. Barnum, chairman of the Council on Journalism, W. W. MacQueen, president of the American Association of Dental Editors, and J. C. A. Harding, member of the Council on Journalism.

DENTAL HEALTH COUNCIL PLANS THREE CONFERENCES

Plans were outlined for three national conferences relating to the dental health of the public at the June 3 and 4 meeting of the Council on Dental Health in Chicago. In addition, the Council reviewed the dental program of the Office of Vocational Rehabilitation and developed recommendations on group dental health care plans. These recommendations will be submitted to the House of Delegates at the 96th annual session in San Francisco. They will cover such factors as limitations of benefits provided by the plan, administration and protection of dentists and patients.

One of the conferences to be sponsored by the Council will be devoted to a discussion of the labor movement and is designed to provide background information useful to state societies in their dealings with unions on health plans. The conference has been set tentatively for December.

The Sixth National Dental Health Conference to be held in San Francisco just prior to the annual session will deal with children's dental health. The Council voted also to proceed with arrangements for the Joint Conference on Federal Dental Programs to be cosponsored by the Council on Dental Health and the Council on Federal Dental Services.

COUNCIL SEES NEED TO LIMIT NUMBER OF SPECIALTIES

There is a need for limiting the number of dental specialties and for redefining the specialty areas. This was the substance of a resolution adopted by the Council on Dental Education at its May 26-28 meeting in Chicago. Presiding at the meeting was Philip E. Blackerby, Jr., council chairman.

The Council voted to hold the third workshop on dental specialties in 1956 with representatives of the American Association of Dental Schools, the American Association of Dental Examiners and specialty boards and groups in order to "consider a workable plan of defining and recognizing the dental specialty areas."

The moratorium on acceptance of

new specialty applications will continue "until a solution is reached . . . to prevent over-segmenting dental practice," the Council resolution said. In other actions, the Council approved residency and internship training programs in 14 additional hospitals, bringing the total number of approved programs to 163; agreed to conduct a survey on the military status of senior dental students in cooperation with the Department of Defense, and voted to conduct a workshop on the training of dental laboratory technicians.

The Council granted full approval to Baylor University College of Dentistry and to four dental hygiene programs. Two of the dental hygiene programs, at the University of North Carolina in Chapel Hill, and at the State University of Iowa in Iowa City, were accredited for the first time. The other two programs, at Erie County Technical Institute in Buffalo, and at the Eastman Dental Dispensary in Rochester, were raised from provisional approval to full approval.

Gerald D. Timmons, dean of the School of Dentistry, Temple University, was nominated as chairman for 1956, and Carl A. Laughlin, secretary of the West Virginia board of dental examiners, was elected vice-chairman.

The Council presented plaques to three outgoing members; Arthur W. Easton of Norway, Me., Robert W. McNulty of Los Angeles and Eugene R. Westcott of Atlantic City, N. J.

REVISE BLACK DENTAL LITERATURE CLASSIFICATION

The Classification for Dental Literature, devised by Arthur D. Black, and in use in 22 dental schools for the classification of book collections, has been revised. Copies of the revision have been mailed to all the dental schools and dental school libraries, according to Donald Washburn, director of the American Dental Association Bureau of Library and Indexing Service.

In general, Dr. Washburn explained, the broad outline of Dr. Black's classification has remained unchanged. The division on basic (nonclinical) sciences has been enlarged, however, and a new division, anesthesia, has been added, he said. Other changes also have been made.

INCREASE REPORTED IN FILM LIBRARY COLLECTION

An increase in the amount of audio-visual material available from the Film Library of the Bureau of Library and Indexing Service has been reported by Helaine Levin, film librarian. In addition, a study

THE WHITE HOUSE
WASHINGTON

April 20, 1955

Dear Mr. Lynch:

Thank you for your recent letter. I am gratified, as I know all Americans are, by the support you and the members of the American Dental Association are giving to the American-Korean Foundation. It has long seemed to me that in our efforts to help rebuild Korea, we can demonstrate in the most effective manner possible what a democracy really is -- and I am most gratified by the cooperation of American dentists with those of Korea.

With warm regard,

Sincerely,

Dwight D. Eisenhower

Mr. Daniel F. Lynch
President
American Dental Association
1678 Primrose Road, N. W.
Washington, D. C.

In a letter to Daniel F. Lynch, president of the American Dental Association, President Eisenhower expressed his gratification to Association members for their support of the special dental fund of the American-Korean Foundation. As of June 16, $11,350 had been contributed.

of the past year's records shows a 38 per cent increase in the use of these materials by professional groups. The greatest increase in use has been by dental societies and governmental agencies.

There are now 127 film titles and 520 prints; 101 of these films are on technical subjects, 26 on aspects of dental health. The figures represent an increase of one third in the technical category and an increase of one fourth in the dental health field. The film library has also 8 filmstrip titles and 26 slide titles.

Copies of the brochure *Audio-Visual Materials in Dentistry* and the current (May) supplement, describing the material available, may be obtained from the Film Library at the Central Office.

RELIEF FUND AT $111,000 AS DRIVE ENTERS FINAL WEEKS

The 1954-55 Relief Fund campaign moved into its final two weeks June 15 with $111,118 in contributions. The mid-June total was more than $5,000 ahead of last year's final figure and more than $11,000 over the $100,000 campaign goal.

EXPLORE SCHOOLS' USE OF AUDIO-VISUAL MATERIALS

The extent to which audio-visual methods such as television, films and film strips are used by the dental schools is being explored by the Film Library of the Bureau of Library and Indexing Service. A questionnaire sent to the dental schools requests information on such things as the names of films produced recently by the schools, the amount and type of audio-visual equipment owned by the schools and the extent of participation of faculty members in educational TV programs.

"The results of this survey will assist us in developing our audio-visual program so that it will be of greater service to the schools," stated Helaine Levin, film librarian. "It will also help us expand our central clearing house of audio-visual information and give us valuable data on the use of television in dental education," she said.

REPORT ON CONFERENCE ON STANDARDS FOR CARIES STUDY

The report on the Conference to Develop Uniform Standards and Procedures in Clinical Studies of Dental Caries has been completed and will soon be published. A limited number of copies will be available. The conference was held November 2 and 3, 1953, under the cosponsorship of the Councils on Dental Health, Dental Research and Dental Therapeutics. The Councils have cooperated in completing the report.

National Defense

POINTS APPROVED FOR SAN FRANCISCO MILITARY SEMINAR

Retirement points will be given Navy reserve dental officers for attendance at a dental-military seminar in San Francisco October 17-19. The seminar at Treasure Island is being held in conjunction with the American Dental Association's 96th annual session but will be separate from that meeting. A maximum of three retirement points may be earned by those attending the seminar, according to Bureau of Naval Personnel Notice 1301.

SUBSCRIPTS • The Army Medical Corps will conduct a training course in the management of mass casualties September 21 at the New York Academy of Medicine in New York and one September 24 in Boston at the meeting of the Massachusetts Academy of General Practice.

Directors of dental officer training programs attended a conference May 5-7 of the Dental Division, Bureau of Medicine and Surgery, Department of the Navy. Shown (l. to r.): Rear Admiral Herman P. Riebe, Inspector General, Dental; Gerard J. Casey, American Dental Association, consultant to the group; Capt. Curtiss W. Schantz, commanding officer; Shailer Peterson, American Dental Association, consultant, and Rear Admiral Ralph W. Malone, Chief, Dental Division.

A dental officer from the Chinese Nationalist Army was among 16 officers who recently completed an advanced dentistry course at Walter Reed Army Medical Center. He is Capt. Keh-Kang Chu, shown receiving his certificate from Brig. Gen. Arthur L. Irons, director of dental activities at the Center. Looking on are Col. Pen-yeu Lu, Chinese Nationalist Army, and Daniel F. Lynch, president of the American Dental Association.

Col. F. R. Corbin (left), chief of the dental service, Osaka Army Hospital, Japan, congratulates Lt. Arnold B. Schaffer for receiving the Commendation Ribbon, awarded for meritorious service in Korea. Lieutenant Schaffer is a member of the First District Dental Society of New York.

The U.S. Naval Dental School at the National Naval Medical Center, Bethesda, Md., has developed a set of moulages for use in casualty treatment training. The moulage, strapped tightly to a volunteer, is connected by rubber tubing to a central fluid supply, which may be adjusted to create a flow of simulated blood. The moulage responds to the treatment administered.

Senior dental surgeons from every major command of the U.S. Air Force met in Washington, D.C., May 17-19, to discuss management improvement and to exchange information on professional and administrative matters. Brig. Gen. Marvin E. Kennebeck, assistant for dental services, Office of the Surgeon General, was official host. Maj. Gen. Dan C. Ogle, surgeon general, U.S. Air Force Medical Service, gave the welcoming address. Special lectures were presented by Col. Perry C. Bullard and Maj. Stephan L. Roziakis, both of Headquarters, USAF. Col. John K. Sitzman was conference moderator.

Dental Societies

SOCIETIES PROTEST BILL LICENSING TECHNICIANS

A proposed law which would permit Illinois dental laboratories to sell dentures directly to the public has been protested by the Chicago and Illinois dental societies. The bill, reported out favorably by a committee of the Illinois House of Representatives, would license "public denturists" who, in order to qualify for a license, would need only two years of training in a trade school or similar institution. The bill has been characterized as "a menace to public health" by Chicago newspapers. Deans of the dental schools also have joined in the effort to defeat the bill.

"This proposal would set the dental profession back 100 years—to the days when we had apprentice dentists," stated A. Raymond Baralt, dean of the Loyola University dental school.

The introduction of the "public denturists" legislation followed the successful court fight of the Chicago Dental Society in which the Cook County Superior Court enjoined 20 dental laboratories from dealing with the public. The new bill is considered an attempt to circumvent the Court's decision and, according to reports, is supported by only a few of the laboratories. Organized dentistry has been supported in its opposition to the bill by the Illinois Dental Laboratory Association, representing 93 per cent of the laboratories in the state.

A court decision affecting the status of dental technicians was handed down May 4 in Idaho. There the State Supreme Court ruled that dental technicians may work on artificial dentures directly for the public. In an unprecedented ruling, the Court held that the technicians might not do intraoral work but might reline, repair and duplicate dentures. The Court

declared unconstitutional a 1953 amendment to the dental practice act which specifically limited the technicians to work authorized by a licensed dentist. The ruling reversed the decision of a lower court.

TO SURVEY HEALTH PLANS IN FOUR STATES

A survey of group dental health care programs presently in operation in four states was recommended by the Joint Committee on Dental Health Care at its May 22 meeting in Philadelphia. The committee is composed of representatives of the state dental societies of Delaware, New Jersey, New York and Pennsylvania. Programs in these four states which operate at local, state and federal levels will be included in the study. Eugene W. Newman of Redbank, N. J., was named chairman of the joint committee; John G. Carr of Camden, N. J., is secretary.

MARYLAND SOCIETY LISTS OFFICERS FOR COMING YEAR

Elected officers at the May 2-4 annual meeting of the Maryland State Dental Association held in Baltimore were: Kyrle W. Preis, president; Charles Broadrup, president-elect; Russell Smith, vice-president; C. L. Inman, secretary, and S. H. Bryant, treasurer.

RUSSELL BUNTING RECEIVES ALFRED FONES AWARD

Russell W. Bunting, dental consultant to the Federal Civil Defense Administration, was presented with the annual Alfred C. Fones Award of the Connecticut State Dental Association at the society's annual meeting in Hartford May 19. The award is given each year to an individual who has made an outstanding contribution, either of a theoretical or technical nature, to the dental profession. Last year's recipient was Harold Hillenbrand, secretary of the American Dental Association.

OLD TIMERS FETED AT KENTUCKY MEETING

Dentists who had practiced 50 or more years were honored at a luncheon during the 95th annual meeting of the Kentucky State Dental Association in Louisville April 18-21. They received plaques in recognition of their long service.

Elected officers of the state group were John A. Atkinson, president; Arthur M. Elam, president-elect; A. P. Williams, first vice-president; T. J. Boldrick, second vice-president; Paul Webb, third vice-president; A. B. Coxwell, secretary-treasurer; F. S. Vogt, librarian, and Lee T. Garrott, member of the board of censors.

DENTAL HEALTH SERVICE, INC., RECEIVES SPENADEL AWARD

Dental Health Service, Inc., of New York City, a dental clinic established to provide dental care for low income families, has been selected to receive the $500 Special Henry Spenadel Award. The announcement was made by the Board of Directors of the First District Dental Society late in April. The clinic was chosen because of the high quality of dental care provided by it to persons who cannot afford treatment by a private practitioner. Dental Health Service is an independent voluntary nonprofit health agency supported by gifts.

NEW JERSEY DENTISTS STUDY DISASTER CARE

Swift emergency casualty care in case of atomic attack or other unforeseen disaster was taught to 105 members of the New Jersey State Dental Society at a Civil Defense Symposium at Princeton

University June 4 and 5. The casualty courses were arranged by the medical and health services of the State Division of Civil Defense and cosponsored by the State Department of Health and the New Jersey State Dental Society.

Robert E. Rankin, chairman of the Civil Defense Committee of the New Jersey State Dental Society, presided at the first session. John Campi, president of the society, presided at the second session, and John Carr, society secretary, and member of the American Dental Association Subcommittee on Civil Defense, was chairman of the closing session.

THOMAS J. HILL HONORED BY OHIO DENTAL SOCIETIES

Thomas J. Hill, a leader in dentistry, was honored by the Cleveland Dental Society and the Ohio State Dental Association May 10. The Cleveland society made him an honorary life member; the state group sent him a plaque which hailed him as a "counselor and friend of each and every member of the association."

Dr. Hill retired in June from the faculty of Western Reserve University School of Dentistry and the School of Medicine, where he taught for 46 years.

Varaztad H. Kazanjian, M.D., (left), Boston plastic surgeon, received the First Honorary Award of the Massachusetts Dental Society from President George J. Fink at the 91st annual session in Boston May 1-4.

Guests at the Oregon State Dental Association's 62nd annual session in Portland in March were (l. to r.): Harold M. Kramer, state society president; Balint Orban, Loyola (Chicago) University School of Dentistry; Cmdr. K. K. Bridge, Naval Dental School, Bethesda, Md.; Cecil H. Bliss, president, American Denture Society; Charles L. Pincus, Beverly Hills, Calif.; Clarence S. Renouard, 11th District Trustee, and Daniel F. Lynch, president, American Dental Association.

He has served dentistry also as a member of the American Dental Association's Council on Dental Therapeutics. In recognition of his 25 years of service on the Council, which included serving as its chairman from 1947 through 1954, the Association at its annual session last November made him an honorary member.

Dr. Hill has just completed a visit to all the dental schools in the United States to check research facilities for the U.S. Public Health Service.

PAN-PACIFIC CONFERENCE INCLUDES ISLAND TOUR

The Pan-Pacific Dental Conference to be held in Hawaii October 24 and 25 will include a two day scientific meeting and a special tour of the Islands. The conference is sponsored by the Honolulu County Dental Society. Planned for dentists who wish to combine a Hawaiian vacation with attendance at the conference, the meeting has been scheduled also for the convenience of those attending the American Dental Association's annual session in San Francisco October 17-20.

Dentists interested in the Hawaiian conference may write to Pan-Pacific Dental Conference, 3124 E. 14 St., Oakland 1, Calif.

SOCIETY FORMS CORPORATION FOR PREPAID DENTAL PLANS

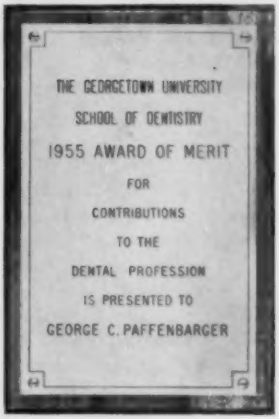
The California State Dental Association in June announced formation of a nonprofit corporation to offer prepaid dental care to unions and other groups on an indemnity basis. The new corporation, called the California Dental Association Service Plan, will provide a mechanism for handling such programs as the one now operated by the Continental Casualty Company for the International Longshoremen's and Warehousemen's Union and the Pacific Maritime Association. Under California law, the corporation must be approved by 25 per cent of the state's 8,800 licensed dentists before it can begin to operate.

SUBSCRIPTS • A new editor has been named for the Chicago Dental Society's *Fortnightly Review*. He is Elmer Ebert, who succeeds Edward J. Sullivan. Dr. Sullivan retires from the *Review* after serving it in various editorial capacities for 11 years. . . . On the West Coast, a new dental publication has made its appearance. *DDS*, publication of the Los Angeles County Dental Society, appeared June 1, under the editorship of Hugh D. Wilson. Howard V. Jones is associate editor. . . . The New Britain (Conn.) Dental Society has voted to provide members of the 1955 New Britain High School football squad with custom-made mouth guards. The mouth guards, which will be supplied free, are being provided, says the society, because "missing front teeth are more common than mouth guards among high school football players."

Dental Education

MINNESOTA SPONSORS SEMINAR ON STUDY OF ORAL MEDICINE

Dental use of the antibiotics and other antibacterial drugs, an appraisal of newer methods of cavity preparation and control of periodontal disease are among the topics of the Tenth Annual Seminar for the Study and Practice of Oral Medicine sponsored by the University of Minnesota in Minneapolis. The seminar will be held September 23 and 24. Included on the faculty are Harold A. Maxmen, Charles H. Williams, John M. Gules, J. R. Jensen, W. H. Crawford, D. F. Mitchell and Floyd D. Ostrander.



Georgetown University presented its 1955 Award of Merit to George C. Paffenbarger, Association senior research associate at the National Bureau of Standards. The award was bestowed at ceremonies May 26.

GEORGE C. PAFFENBARGER HONORED BY UNIVERSITY

George C. Paffenbarger, Association senior research associate at the National Bureau of Standards in Washington, D. C., was given the Award of Merit for 1955 by the School of Dentistry, Georgetown University, at ceremonies May 26. The honor was conferred for "significant contribution to dental research in the field of dental materials during the past 25 years." In announcing the award, the dental faculty cited his research on the inlay casting process, silicate cement and hydrocolloid impression materials.

SCHOOL CONFERS HONORARY DEGREE ON EDWARD WHITE

Edward R. White, Association trustee for the fourth district, received an honorary doctor of laws degree at the 99th annual commencement ceremonies of Seton Hall University at South Orange, N. J., June 11. The award was made in recognition of Dr. White's contributions to dental education in New Jersey. The school conferred honorary degrees also on Gen. Matthew Ridgway, Army chief of staff, and Edward J. McCormack, M.D., immediate past president of the American Medical Association.

SCHOOLS SCHEDULE COURSES, OFFER FELLOWSHIPS

Alabama • A residency in periodontics and one in prosthodontics are available at the University of Alabama School of Dentistry in Birmingham. The residencies are offered in conjunction with the Veterans Administration Hospital.

The VA requires that residents be American citizens. After a probationary period, the candidate may be admitted to the graduate school for a course leading to the Master of Science degree.

California • Crown and bridge prosthesis will be taught at the University of California College of Dentistry in San Francisco September 16-18. The faculty will consist of J. Raymond Gill, Joseph V. Mitchell, Carroll H. Berryman, Jack E. Dodson, Lauro Quiros and Robert B. Shilling, all of the College staff. Enrollment closes September 7.

Columbia • Four postgraduate courses in periodontology, two of them full-time and two part-time, are offered by Columbia University

Daniel F. Lynch (left), president of the American Dental Association, talks with Dean Benjamin L. Lynch at the Golden Jubilee Celebration of Creighton University held in April in Omaha.

School of Dental and Oral Surgery in New York. The full-time programs cover two academic years; the half-time courses four years. Of the two part-time courses, one will be given a full day a week and the other one half a day a week beginning September 21. Further information may be obtained from the postgraduate division of the school.

New York • Research and teaching fellowships are available from the New York University College of Dentistry in New York. The stipend for a fellowship is about $3,500. Application blanks and additional information may be obtained from the Committee on Research and Fellowships at the college.

Saint Louis • The Saint Louis University School of Dentistry in Saint Louis, Mo., has announced three postgraduate courses for the 1955-56 academic year. They are "Full Denture Prosthesis," September 12-17; "Occlusal Equilibration," January 2-7, 1956, and "Endodontics," May 28 to June 2, 1956. The courses will be participation classes with each student handling one or more patients. Attendance is limited.

Temple • Temple University School of Dentistry in Philadelphia announces a two week course in orthodontics, January 22 to February 4, 1956. The course will be under the direction of Robert H. W. Strang and is limited to specialists in orthodontics who are members of the American Association of Orthodontics or associate members of a component society of the American Association of Orthodontics.

Tufts • Two courses in occluso-rehabilitation are scheduled for the fall months at Tufts College Dental School in Boston. The first one, a lecture and seminar course, is offered September 19-23; the second, a special participation course, will be presented every other week on Friday and Saturday for seven months beginning October 7. Both programs will be under the direction of Louis Alexander Cohn.

In addition, two participation courses in periodontology are offered: November 14-18, and April 9-13. Both are under the direction of Irving Glickman. Attendance at each is limited to 12.

SUBSCRIPTS • Frederick S. McKay, a pioneer in the study of fluorides, received an honorary degree from Western Reserve University in Cleveland June 15. Another pioneer in the field, Thomas J. Hill, introduced Dr. McKay at the presentation. . . . Dedication ceremonies are September 18 for the new School of Dentistry Building, College of Medical Evangelists, Loma Linda, Calif. . . . Arthur E. Smith, of the University of Southern California, was awarded the honorary degree of Doctor of Science by the Arizona State College May 24 in recognition of his contributions to maxillofacial rehabilitation and oral surgery.

International

JOHANNESBURG SCHOOL SEEKS LECTURER IN PROSTHETICS

The University of the Witwatersrand, oral and dental hospital and department of dentistry, in Johannesburg, Union of South Africa, seeks a dentist to serve as senior full-time lecturer and clinical instructor in dental prosthetics. The salary runs from $4,480 to $5,880 a year plus a $655 temporary cost of living allowance.

Applications for the position are being handled through UNESCO. Persons interested should apply to the Exchange of Persons Service of UNESCO, 19 Avenue Kléber, Paris 16, France.

JOHN KNUTSON TO HEAD WHO DENTAL PROGRAM

Formation of a dental program as a permanent part of the activities of the World Health Organization is scheduled to begin July 1 under the direction of John W. Knutson, chief dental officer of the U.S. Public Health Service. Dr. Knutson is being assigned to WHO for a six month period, it was announced by Surgeon General Leonard A. Scheele.

The launching of a dental program by WHO is the result of a long campaign waged by the Fédération Dentaire Internationale. The American Dental As-

sociation also has supported efforts to establish a permanent dental program within the international organization. Plans for the dental program were reviewed at the Eighth World Health Assembly held in Mexico in May.

Dr. Knutson is familiar with international dental health programs. He has been active in the F.D.I. and is currently vice-president of its Public Dental Health Services Commission. He was chairman of an international group of dental consultants who met in Geneva last year under the sponsorship of WHO.

AUSTRIAN DENTISTS CALL SEPTEMBER CONFERENCE

Prosthetics, surgery, orthodontics and conservative dentistry are the four major topics on the program of the Austrian Congress of Dentists to be held September 1-9 in Linz-Donau. In addition to the essays, a scientific exhibition and a social program are planned. Reservations for the congress should be made before August 10 and may be obtained from Doctor Hofer, Medizinische Gesellschaft für Oberösterreich, Fachgruppe Zahnheilkunde, Linz-Donau, Dinghoferstrasse 4, Austria.

FIFTEEN NATIONS TAKE PART IN CARIES STUDY SESSION

Fifteen countries, represented by 62 persons, participated in the scientific session of the Study Group for Fluorine Research and Caries Control in Geneva, Switzerland, May 15-19. The delegates discussed the factors which must be taken into account in the statistical evaluation of caries data, voted to hold the next study session in Yugoslavia in May 1956, heard reports from the board of directors and elected officers for the 1955-56 term.

Elected were Hs. R. Held, Geneva, president; Professor Chaput, Paris, and Professor Heuser, Marburg, Germany, vice-presidents; H. J. Schmidt, Stuttgart, general secretary; S. Koller, Wolfsberg, Austria, chief of protocol, and M. Joachim, Brussels, and V. Krusic, Ljubljana, Yugoslavia, auditors.

The topics of the 1956 meeting will be fluorine and caries, caries and food, and caries and general health.

TWO TOURS PLANNED BY GERMAN TRAVEL ASSOCIATION

Study tours of West Germany planned for persons attending two dental conferences in Europe have been scheduled by the German Educational Travel Association, a nonprofit organization. The first tour, which precedes the 43rd annual meeting of the Fédération Dentaire Internationale, will be August 7-13. Tour members will visit Wuerzburg, Rothenburg, Heidelberg, Frankfurt-on-Main, Wiesbaden, Koblenz, Bonn and Duesseldorf. Included will be trips to a number of university dental clinics and dental instrument factories, lectures by German professors and comprehensive sightseeing.

The second tour, August 28 to September 5, precedes the meeting of ARPA (International Association for Research in Periodontal Disease). Interpreters will accompany both tours. Reservations, which must be made at least three weeks before the start of the tours, may be obtained through the German Educational Travel Association, Nuremberg, Veillodterstr. 1, Germany.

ARGENTINE ASSOCIATION REMODELS HEADQUARTERS

The American Dental Association is not the only dental society with a building program. South of the border, the Asociacion Odontologica Argentina is remodeling its headquarters in Buenos Aires. Ricardo Crespi, THE JOURNAL's Argentine correspondent, reports that the

remodeling, progressing rapidly, will soon provide more ample quarters for the Asociacion.

Dr. Crespi reports also that the Cooperativa Odontologica de Prostesis of Buenos Aires has appointed its administration council, the group's governing body. Serving are: Pedro Saizar, president; Miguel A. Finochietti, vice-president; Horacio C. Mazariegos, secretary; Samuel Pisarencko, treasurer. The members of the board of trustees are: Carlos Waissbein, Abrahan Krasuk, Hermegildo Arnejo, Raúl Petrossi, Eduardo Silvestre, Hector Bravo, Rómulo Cabrini and Oscar Maisto.

Prof. N. Quereilhac was elected president of the Sociedad Argentina de Cirugia Dento-Maxilo-Facial of Buenos Aires at its last meeting. Reelected president of the Circulo Odontologico Santafesino of Sante Fe was Rodolfo J. Cristina.

In conjunction with the Circulo Odontologicao de Parana, Dr. Cristina's organization will sponsor two meetings dedicated to dentistry. The dates are May 22 and August 12.

The Circulo Odontologico de Cordoba will hold its annual meeting in August. Servando Garcia Faure heads the arrangements committee.

VENICE MEETING SCHEDULED FOR INTERNATIONAL ARPA

Venice, Italy, will be the scene of the fourteenth congress of the International ARPA September 6-11 when the Italian Section of ARPA plays host to the international meeting. Persons wishing to present papers at the congress may write to Jean Matthey, general secretary of the International ARPA, 2 Rue Bartholomy, Geneva. Those interested in presenting clinics or films may apply to Prof. J. N. Nally, 8 rue de Saussure, Geneva. Prof. C. Zerosi of Milan is president of the Italian section.

ITALIAN DENTISTS SCHEDULE SEPTEMBER CONGRESS

The 30th Italian Congress of Stomatology, organized by the Italian Dental Association, will be held in Naples September 12-17. An international scientific exhibit and the business sessions of the Congress will be held at the University of Naples. Visits to museums and historic sites are planned. Prof. G. Giardino is chairman of the organizing committee. L. Benedetti is president of the Italian Dental Association.

Persons wishing to present papers or scientific exhibits may write to the 30th Italian Congress of Stomatology, Clinica Odontoiatrica dell'Università di Napoli, S. Andrea delle Dame, Naples 6, Italy.

HOLLAND ISSUES STAMP SHOWING TOOTHBRUSHING

What is probably the first stamp depicting toothbrushing has been issued by the government of Holland. The olive green stamp shows a little girl standing before a basin brushing her teeth. The stamp is one of a series of five issued to raise funds for Holland's child welfare work and shows the country's interest in child health. The five stamps may be purchased for 20 cents plus mailing costs from the Philatelic Service, The Hague, Netherlands.

ENRIQUE UHALDE HEADS ARGENTINE ASSOCIATION

Enrique Uhalde was elected president of the Sociedad Argentina de Ortodoncia in Buenos Aires recently. Other officers elected to serve for terms ending in 1957 were: Jorge Bisi, vice-president; José Luis Ferrería, secretary; Orfilio Caffesse, assistant secretary; Alberto O. del Intento, treasurer, and Fernando Archain, assistant treasurer.

Elected to the Tribunal of Honor were

Juan Ubaldo Carrea, president, and Armando E. Monti, secretary. The financial committee members are Edmundo G. Locci, Edmundo Camani Altube and Florencio Ponce (h).

ELECT OFFICERS OF PARAGUAYAN SOCIETY

New officers for the Circulo de Odontologos del Paraguay were elected March 27. They are: Artemio Salerno Netto, president; Víctor A. Boettner, vice-president; César B. Franco, secretary; Miguel Angel Barreiro M., assistant secretary; Carim Bittar, treasurer, and Norman Zavala, assistant treasurer.

DENTISTS WARNED AGAINST INTERNATIONAL GROUP

Dentists have been warned not to join the International Dental Institute. In a letter written in May to dental associations, G. H. Leatherman, secretary-general of the Fédération Dentaire Internationale, informed the profession that the Institute had been investigated by Scotland Yard and had been found to be fraudulent. The Institute has been contacting practitioners mainly in the Spanish speaking countries, Dr. Leatherman wrote.

CANADIAN SOCIETY INSTALLS R. R. McINTYRE AS PRESIDENT

R. R. McIntyre of Calgary was installed as president of the Canadian Dental Association at the Association's convention held in Toronto in May. K. M. Johnson of Winnipeg was chosen president-elect. The Canadian group conferred honorary membership on Harold Keith Box of Toronto and approved the establishment of a lectureship in his name.

Public Health

A.M.A. MAGAZINE AFFIRMS FLUORIDATION SUPPORT

Antifluoridationists who have claimed that the American Medical Association has not endorsed fluoridation were answered in the June issue of *Today's Health*, A.M.A. publication. George P. Lull, M.D., A.M.A. secretary and general manager, in an editorial reviewed the scientific evidence for fluoridation and affirmed A.M.A. endorsement, stating:

> It is true that the endorsement did not urge any action whatsoever upon responsible officials because that is not the function of the Association. But the A.M.A. Council on Pharmacy and Chemistry and the A.M.A. Council on Foods and Nutrition expressed themselves definitely to the effect that fluoridation is safe. If this is not an endorsement—what is it?

GRAND RAPIDS PHYSICIANS SAY FLUORIDATION SAFE

Ammunition was provided recently by Grand Rapids physicians to answer arguments of Michigan antifluoridationists who have been making a concerted effort to obtain a state law prohibiting fluoridation in the state. The Kent County Dental Society obtained written opinions of practicing physicians who have had an opportunity to observe the systemic effects of the health measure on individuals who have been drinking fluoridated water for ten years. Physicians whose opinions were obtained included specialists in research, surgery, cardiology, urology, dermatology, pathology, ophthalmology, and public health.

W. B. Prothro, M.D., Grand Rapids

health director, pointed out that actually there had been a slight decrease in the death rates for heart disease, nephritis, intracranial lesions and cancer—the diseases most frequently alleged by antifluoridationists to have increased since 1945, the year the health measure was introduced. Dr. Prothro stated that the decrease was not necessarily a result of fluoridation but that it did refute the argument that fluoridation increases disease.

DENTAL DIRECTOR SOUGHT FOR VERMONT HEALTH POST

A 20 year campaign by Vermont dentists bore fruit recently when an initial appropriation of $15,000 was voted by the Vermont legislature for the establishment of a new dental division in the Vermont State Department of Health. A dental director is to be appointed by September 1. Persons interested in the position should write to Francis A. Reid, Windsor, Vt., a member of the state health commission.

HAWAII SEEKS DENTAL HYGIENISTS

Positions as dental hygienists are available in the Territory of Hawaii, according to a June 9 announcement of the Hawaiian Department of Civil Service. The position pays $239.59 a month. An applicant must be a graduate of a school of dental hygiene recognized by the Territorial Board of Dental Examiners or have an equivalent combination of experience and training. Further information may be obtained from the Department of Civil Service, Territory of Hawaii, 825 Mililani St., Honolulu 13.

POPULAR SCIENCE MAGAZINE TELLS FLUORIDATION STORY

The July issue of *Popular Science*, a monthly magazine with a circulation of a million and a half, carries an illustrated article on fluoridation. The article describes the favorable results of the Kingston-Newburgh project, including the results of the careful medical tests made to check systemic effects of the health measure, cites several other studies, explains the mechanical procedure of fluoridating water and maintaining a check on it, and lists some of the antifluoridation arguments and the answers to them. The magazine is published in New York.

SUBSCRIPTS • Robert A. Downs, Colorado dental director and president of the Colorado State Dental Association, presided at the June 23 and 24 meeting of the Colorado Public Health Association in Estes Park, Colo. Dr. Downs is a member of the American Dental Association Council on Dental Health. . . . Fluoridation of public water supplies was unanimously reendorsed at the Sixth Biennial Conference of State and Territorial Dental Directors May 9. . . . A fluoridation study is being carried on in Chile. Curicó, population 21,153, is fluoridating its water supply. The nearby city of San Fernando serves as control.

General

BETH ISRAEL HOSPITAL PLANS FALL COURSES

Beth Israel hospital in Boston announces two postgraduate courses in periodontics for the fall of 1955. The first, a one week course in occlusal adjustment, will be given from September 28 to October 2. It will include background material on the anatomy, histology and physiology of the periodontium and dental apparatus. The second course, scheduled October 31 to November 11, will present the technics of periodontal therapy. Material will be presented by lecture, demonstration and clinic.

FORM NORTHWEST SOCIETY OF ORAL SURGEONS

The Northwest Society of Oral Surgeons has established its headquarters in Seattle, announces Thomas J. McIntyre, society secretary-treasurer. The group is engaged in expanding its membership to all oral surgeons in Washington. Persons interested are asked to write to Dr. McIntyre, 744 Stimson Bldg., Seattle 1.

Frederick H. Francis is president of the society, Jack C. Garretson, vice-president.

DENTIST IS CHAMBER OF COMMERCE MAN OF THE YEAR

C. E. Rutledge of Richmond, Calif., has been chosen man of the year by the Richmond Junior Chamber of Commerce. Doctor Rutledge, a Richmond resident since 1910, has been active in the community and in organized dentistry as well.

He served as a member of the executive council of the California State Dental Association for eight years, as the state society's delegate to the American Dental Association's House of Delegates and as chairman of the state group's 1950 annual meeting. In addition, he has served on many committees and has been president of the Contra Costa component society.

Dr. Rutledge has been a member of the Richmond High School Board for ten years, president of the Richmond Y.M.C.A. since 1937 and a member of the Board of Boys Clubs of America. He is chairman of the Mayor's Committee on Art and Culture.

CLOSED CIRCUIT TV A FEATURE OF SOCIETY PROGRAM

Closed circuit television direct from the operating rooms of the College of Physicians and Surgeons in San Francisco will be a feature of the October 15 and 16 meeting of the American Society of Dentistry for Children in San Francisco. Technics of the various aspects of pedodontics will be demonstrated, including those of surgery, cavity preparation, anesthesia and patient management.

In addition, the society plans to have table clinics and essayists. A dinner dance will honor society president Willard Hunnicott.

Also • All rights and royalties from M. D. K. Bremner's *Story of Dentistry,* third edition, have been transferred to the American Association of the History of Dentistry as a gift from the author. Proceeds from book sales will be used to make an annual award for student essays on some aspect of dental history. . . . *Dental Record* published its last issue with the February-March number. It has been merged with the *Dental Practitioner,* published at the Stonebridge Press, Bath Road, Bristol 4, England. . . . The American Society of Oral Surgeons will meet at the Ambassador Hotel in Los Angeles October 11-14. . . . Also meeting in October is the Pacific Coast Society of Prosthodontists. It meets October 14 and 15 in San Francisco. . . . The F. Calenda award for cancer detection was given during the current year to William Bates, senior dental student at the University of Detroit School of Dentistry. . . . T. M. Graber, of Northwestern University Dental School, is lecturing in major European cities during the summer. Dr. Graber will speak also at the meeting of the Fédération Dentaire Internationale in Copenhagen.

Book Reviews

THE ADAPTIVE CHIN

By E. Lloyd DuBrul, D.D.S., and Harry Sicher, M.D. 97 pages with 47 illustrations. Price $3.50. Springfield, Ill., Charles C Thomas, 1954.

This thought-inducing monograph belongs to the American Lecture Series in Anatomy. The authors are well known in dental anthropology and anatomy, and they have been aided by distinguished collaborators.

The history of the chin as part of the mandible, of the mandible as part of the face and of the face in relation to the skull as a whole is reviewed and discussed. The phylogenetic history of the human chin is reviewed by tracing the fossil record and considering the part played by the development of erect posture among the chin-possessing orders. The conclusion reached is that the fashioning of the chin, whether in man or other animals, is part of a general adaptation to upright posture and locomotion.

The authors are to be admired for their contribution to our thinking and for insisting that the primates are no law unto themselves. According to their epilogue "Closely similar changes of skeletal form always accompanying behavioral changes in bodily orientation have been found in orders entirely unrelated to each other or to the primates. There seems to be, at present, no scientifically sound reason why such parallel changes cannot be used as controls in interpreting primate evolution."

An excellent bibliography of 90 titles adds to the usefulness of the work.

John A. Cameron

ANTIBIOTICS AND ANTIBIOTIC THERAPY—A CLINICAL MANUAL

By Allen E. Hussar, M.D., and Howard L. Holley, M.D. 475 pages. Index. Price $6. New York, The Macmillan Co., 1954.

This book is divided into three sections, all of which are well organized and highly readable. The first two are entitled "Fundamentals of Antibiotic Therapy" and "General Descriptions of Antibiotics in Clinical Use." These two sections are up-to-date through 1953 and, for most practical purposes, they meet current requirements. The third section, which covers 278 pages, is headed "The Drug of Choice."

Various pathological states associated with infection are discussed, and the chemotherapeutic agents most effective in their treatment are specified. Since antibiotic therapy has changed significantly since late 1953, this latter section does not meet current needs as well as will be desired by most practitioners. For example, the use of benzathine penicillin G, tetracycline and combinations of streptomycin and dihydrostreptomycin has increased considerably since this book was written.

The book contains much background information in readily accessible form. A brief chapter on dental applications is included. The book is directed to students and practitioners of medicine and dentistry. It is attractively printed on good paper, and its price is reasonable.

If the reader supplements his reading of the book with current information such as can be obtained by routine perusal of professional journals and attendance at the scientific sessions of professional society meetings, he will find the book useful.

Donald A. Wallace

COMBATTONS LA CARIE DENTAIRE

By the Société Suisse d'Odontologie. 16 pages with 39 illustrations. Zurich. Zentralstelle für Volks- und Schulzahnpflege, 1954.

This pamphlet, bearing the subtitle "Here is why the fight against dental caries is becoming an urgent necessity," is designed for the instruction of youthful patients, public authorities, physicians, teachers, hospitals, nurses, parents and dietitians. It shows graphically the tremendous increase in the incidence of dental caries in modern times, concentrating on the period since 1945; stresses the relationship between deciduous and permanent teeth, and recommends as an immediate program the following steps: dietary reform, teaching children the importance of proper mastication, good dental hygiene and the fluoridation of water.

During the years of World War II, when less sugar was consumed by children, there was a decrease of 40 per cent in the incidence of caries among six-year-old children, the pamphlet states, but since 1947 the consumption of sugar has risen above prewar levels, carrying with it an increase in dental caries.

N. C. Hudson

PETITE CHIRURGIE DE LA BOUCHE (MINOR ORAL SURGERY)

By R. Thibault and M. Prenant. 186 pages with 267 illustrations. Price not listed. Paris, Expansion Scientifique Francaise, 1954.

This concise, practical monograph attempts to present to the dentist and oral surgeon in a clear, diagrammatic and simple manner the general principles of minor operative oral surgery. It is primarily a treatise of surgical technic intended for the undergraduate dental student.

The first section covers the examination of the patient, preoperative and postoperative care, instrumentation and drugs. Illustrations of the periostomes used by the French school are of interest. General principles of surgical technic are discussed under the headings of wound closure, anesthesia and control of hemorrhage.

Surgical technics for the removal of teeth and the extraction of erupted and unerupted third molars are described. Included also is a discussion of flap procedures for surgical removal of teeth. The impacted lower third molar and maxillary cuspid are covered. Apicoectomy is described in detail, including its application to upper and lower bicuspids. The management of cysts of the jaws is outlined. A short discussion of the managements of acute and chronic infections, including osteitis, is given.

Complications arising in exodontics in which the maxillary antrum is involved and treatment of these complications are described, including plastic closure of oroantral defects. Soft tissue tumors are merely mentioned. The surgical preparation of the mouth before construction of dentures is discussed, and the book closes with a cursory description of the removal of salivary calculi from Wharton's duct. The work is illustrated with 267 excellent diagrams and roentgenograms, as well as two color plates. The simplicity of all drawings conveys their message effectively.

Although incomplete and limited in scope, as well as often cursory in its approach, this book remains a concise, to-the-point little manual. It fulfills the task outlined by the authors in their preface—that of an introduction to oral surgical technics. It is a satisfactory elementary text recommended for dental students and general practitioners who are looking for a step-by-step discussion of the simpler technics used in oral surgery. For the specialist, this manual would be of little use. As for presentation and style, it is well written and makes for enjoyable reading.

Ernest Baden

MANUALE DI STOMATOLOGIA (MANUAL OF STOMATOLOGY)

By D. Mela, M.D. 708 pages with 546 illustrations. Price $12. Torino, Italy, Minerva Medica.

This book compiled by Dr. Mela, with the help of a few distinguished collaborators, may be considered as an introduction to clinical dentistry for the students of medicine and dentistry. The manual contains only the material most useful to both groups.

In Italy, where the physician may practice dentistry without attending a dental school, this book will be valuable and practical. A good discussion with many fine illustrations of every dental problem is presented.

The first 50 pages of this book are devoted to oral anatomy. The second part, about 300 pages, is devoted to microbiology of the oral cavity, focal infection, dental pathology, conservative therapy, periodontics, anesthesia and oral surgery. Fracture of the maxilla, tumors, plastic surgery and antibiotics are thoroughly presented. Over 100 pages written by Dr. E. Ferne of Switzerland are devoted to partial prosthetics and about 80 pages to practical full denture prosthetics. The last part of the book is devoted to orthodontics.

The amount of space allotted to the various topics is in good proportion to their clinical significance, with the exception of orthodontics, a section contributed by Dr. G. May of the University of Bologna. This subject is extensively treated in a book in which only the fundamentals of every subject generally are given.

The book will undoubtedly serve a useful purpose in schools; it is recommended for medical students and could be read with benefit by the practicing dentist as a refresher course. Few books that have appeared in the Italian dental literature have done such a thorough job of condensing in a relatively small volume a wealth of information thoroughly intelligible and comprehensive on every phase of dentistry. The book is smoothly written, logically arranged, beautifully printed and surprisingly easy to read. The vast number of illustrations show that great care and skill have been exercised in their selection and reproduction.

Dr. Mela, teaching professor in the dental school of the University of Torino, is to be congratulated for his contribution to the Italian dental literature. It is hoped that his excellent work will be carried on and that the continued interest of his colleagues will help improve the standard of the dental profession in Italy.

Vito Palazzo

FOLKETRO OM TAENDER, TANDMIDLER OG TANDBEHANDLING HOS ALMUEN I DANMARK (FOLKLORE OF THE TEETH, TOOTH CARE AND TOOTH TREATMENT AMONG THE EARLY PEOPLE OF DENMARK)

By Hedda Boers. 183 pages. Index. Price not listed. Copenhagen, Dansk Videnskabs Forlag, 1954.

Care of the teeth was practiced in a period far earlier than that in which histories of dentistry usually begin. This book is concerned with folk medicine, the ideas about dental disease and its treatment which can be found in Danish folklore and early writings. The book covers the commonly held ideas about the origin of disease, preventive measures used, household remedies, dental hygiene, treatment and the magical powers attributed to teeth. It discusses also the important role ascribed to various saints in the prevention of toothache.

The toothpick is known to have been used as early as the Bronze Age. Among the best remedies for toothache were the reciting of magic formulas and the transplanting of the ache to wood by piercing the offending tooth with a nail and then hammering the nail into wood.

The Danish text is followed by a short English summary. There are a few reproductions of early drawings of St. Apollonia. The paper is good. The print is small but readable.

D. Zabin

LEHRBUCH DER KONSERVIERENDEN ZAHNHEILKUNDE

By Walter Hess, Dr. Med. Fifth edition. 352 pages with 724 illustrations. Index. Price 26 D.M. Leipzig, Johann Ambrosius Barth, 1954.

The author dedicates this rather condensed textbook to the dental student and practitioner. He recommends it as a basic work for continuation of education, and the book fulfills this task. It contains new information on antibiotics and caries.

Dr. Hess divides the subject matter into three parts. A short excursion into the history of dentistry leads to the first chapter on diseases of the hard tooth substances and their treatment. The material is covered extensively and well. The second part covers in detail the diseases of the pulp and apical periodontium.

The third chapter presents the periodontal diseases and their treatment. Here we find a terminology of the diseases different from our own, but the diseases are presented logically and clearly. The local causes and the systemic conditions which are potential factors for the diseases are discussed. The importance of a functional analysis of occlusion prior to treatment is presented also.

Dr. Hess takes the opportunity of repeatedly stressing the need for close cooperation between dentist and physician. This cooperation is important because of the pathological reactions from these diseases, such as inflammation, degeneration, atrophy, hypertrophy, hyperplasia and alterations in osteoblastic and osteoclastic activity.

The illustrations are clear and concise. In my estimation this book is worthy of consideration. It is a fine, basic textbook.

Eugene Schorr

LES PROBLEMES DE LA PRATIQUE DENTAIRE QUOTIDIENNE: DONNEES D'ORGANISATION EN CLIENTELE. (PROBLEMS OF DAILY DENTAL PRACTICE—PRINCIPLES OF PRACTICE MANAGEMENT.)

By Fernand Brochere. Third edition. 556 pages with 124 illustrations. Index. Appendix. Price not listed. Paris, Société des Publications Medicales et Dentaires, 1955.

This enlarged edition is intended as a guide and review in practice management and technical principles of private practice. The material is simply and clearly presented. This book is the only work on practice management available in France. It is timely and presents methods of practice management accepted in America.

The book consists of 16 chapters and is divided into 4 sections. Section 1 acquaints the reader with basic principles of practice management. It outlines many facets of practice generally omitted in other texts. An analysis of the distribution of dentists in France and her colonies is given for the orientation of the young graduate. The choice of type of practice is discussed. Postgraduate work abroad is mentioned. Locating the office is analyzed in great detail. Socialized dentistry is discussed. A chapter is devoted to Taylor's production system as applied to dentistry.

Section 2 begins with a detailed discussion of the psychology of dental practice. The personal objectives of the dentist are analyzed. The importance is stressed of a dentist's making a sensible choice in objective if he is to remain well adjusted. The hazards encountered in practice are listed. Factors liable to increase productivity and maintain optimum

health are stressed. The psychological approach of the author to the patient is interesting. The dental team, consisting of the assistant, secretary, dental technician and associate, is discussed.

Section 3 covers the technical phases of a dental practice and is divided into operative dentistry, prosthetics, and oral surgery. This part is the weakest and could have been omitted. It is obsolete and elementary by American standards.

Section 4 deals with the economic and financial aspects of dental practice. Tax problems, savings, insurance and investment methods are discussed. At the end of this work, a short chapter is devoted to the wife of the dentist. This charming epilogue is written by the author's wife. The book is written in an interesting and entertaining manner. The style is fluent and the book abounds in witty remarks and literary quotations.

The material is well organized. The illustrations are the author's own pencil drawings. Few tables and graphs are available. The bibliography is inadequate and incomplete. The type is of a large size, the paper is satisfactory, but the book is unbound.

Ernest Baden

HEALTH CAREERS GUIDEBOOK

By the National Health Council. 160 pages with illustrations. Available without charge. New York, National Health Council, 1955.

An attractive booklet designed to interest young people in careers in the health services has been prepared and distributed to the nation's high schools. *Health Careers Guidebook,* published by the National Health Council with the support of the Equitable Life Assurance Society of the United States, outlines the scope of the health field and describes in detail 156 different careers from which a young person might choose.

Detailed information is provided on such items as the amount of training required for the particular career, the day-to-day activity of the job, the skills and personality required and the sources of further information. The description of each career was checked by an appropriate professional organization.

A companion booklet, *Partners for Health,* has been prepared for community use. Both booklets are attractively illustrated with drawings and photographs of health workers in action. Both are printed in readable type and on paper of good quality.

In this reviewer's opinion, the *Guidebook* is outstanding. The text presents in simple language—yet without any trace of talking down to its young readers—an attractive and accurate picture of health careers. It provides practical bread-and-butter information and at the same time discusses what a health career offers in nonmonetary satisfaction to the young person choosing it. And it makes an appeal—without sentimentality—to the idealism which exists in so many high school pupils and to their desire to contribute something of importance to the community. The writers of the *Guidebook* seem to understand both the health field and the young people to whom the book is addressed.

D. Zabin

THE PHYSIOLOGICAL BASIS OF MEDICAL PRACTICE

By Charles Herbert Best, M.D., and Norman Burke Taylor, M.D. Sixth edition. 1,357 pages with illustrations. Index. Price $12. Baltimore, Williams & Wilkins Co., 1955.

This new edition perpetuates an important contribution to the understanding of the underlying basis of medical and dental practice. The authors present dynamic physiology in terms of blood as a circulating fluid; respiration; metabolism and nutrition; the endocrines; the nervous system; the special senses, and the excretory products.

The same format as that of earlier editions is maintained, yet scarcely a page has escaped emendation, deletion or addition. The book presents the functional aspects of the body in health and in disease. It links the laboratory and the clinic with the clinical years of undergraduate study. The book is invaluable as it applies our current knowledge to interpreting the symptoms and directing treatment by physicians and dentists alike.

Modern physiology lays the foundation for solving clinical problems of the mouth and the rest of the body. The authors make physiology a fascinating subject in a vivid presentation, accompanied by pertinent illustrations. The chapter on blood coagulation stresses the work of American scientists, omitting recent English and Swedish contributors; otherwise, every aspect of the subject has been discussed from both the morphological and physiological point of view.

The work is an invaluable reference guide, bringing the practitioner's concepts of bodily functions up to the present level of understanding of all the underlying mechanisms.

I. Newton Kugelmass

REACTIONS WITH DRUG THERAPY

By Harry L. Alexander, M.D. 301 pages with 33 illustrations. Index. Price $7.50. Philadelphia, W. B. Saunders Co., 1955.

This book is designed for study and reference rather than for casual reading. The author limits his discussion to the more important drugs and to unexpected reactions following their use in therapeutic doses. Side effects which are expected routinely from certain drugs and which are toxic or due to overdose rather than being antigenic in mechanism are disregarded or mentioned only in passing.

The first four chapters, consisting of 63 pages, are devoted to the introduction of the subject, mechanisms, dermatological manifestations and systemic patterns.

Perhaps 200 drugs are thoroughly covered in the remainder of the text. The kinds of unexpected reactions they can cause, the mechanisms by which they cause them, the severity of the reactions, incidence of fatality and the treatment are described. Many of these drugs are used or prescribed by dentists. Methods for testing for hypersensitivity are described and considered critically. More than a thousand references to the scientific literature are given.

Most of the information presented has been gleaned from previous publications, but some of it is the result of direct inquiry by the author. The material is well organized and easy to read. The typography, paper and binding are excellent.

The book provides ready answers to many questions which arise in everyday practice. It is outstanding in its field.

D. A. Wallace

ELEMENTARY STATISTICS FOR JOURNALISTS

By David Manning White, Ph.D., and Seymour Levine, Ph.D. 83 pages with illustrations. Index. Price $1.50. New York, The Macmillan Co., 1955.

Statistics are essential to scientific research in all fields. Hence it should not surprise the reader that the principles of statistics can be learned against a framework of journalism as well as of dentistry. White and Levine "without going into detailed derivations or discussions on the science of statistics . . . have tried to present the tools as they might be likely to apply to the field of journalism"—and in so doing have succeeded in putting the essence of their message across to the reader regardless of his sphere of interest.

The authors' coverage includes: the need for research tools; getting the study organized; measurement of central tendency (the mean, median, mode); measurements of spread (the standard deviation); the normal curve (its properties, the area under the curve); sampling (sampling error, standard error of the proportions); testing for significance; chi-square; correlations (rank order correlation method, product-moment method of correlation), and exercises.

The authors have handled their limited subject matter succinctly and interestingly and have dealt with a subject of importance and maximum interest in a logical and orderly fashion. The tables and graphs, the length of the text, the type, style, paper stock and binding paper are suitable for the elementary material under consideration. However, if the reader intends to put his newly obtained information to immediate practical application on his own research, he had best subsequently consult one of the standard texts on statistics bearing directly on his field, to which this book will serve as a rewarding introduction.

Austin H. Kutscher

JOCK SUTHERLAND: ARCHITECT OF MEN

By Harry G. Scott, D.D.S. 298 pages with 41 illustrations. Appendix. Price $4.50. New York, Exposition Press, Inc., 1954.

In the world of sports Jock Sutherland's name is synonymous with great ability, outstanding leadership and the knack of getting close to his men. Few knew that, in addition to his athletic prowess, Sutherland was a graduate dentist, had a private practice and taught at the University of Pittsburgh School of Dentistry.

His mark, however, was made on the gridiron—first as a player, but most prominently as a coach and an "architect of men."

Harry G. Scott, the author, has carefully gathered data on the life of this Scotsman who became a great American. The book contains personal letters, photographs and addenda that make a heartwarming story of the life of a fine man.

The story begins with Sutherland's earliest days as one of a large, pitifully poor, but earnestly devoted family. It carries through his youth, early days in this country, ascent to fame and, finally, to his tragic, untimely death.

From a technical point of view, the book is well assembled. Its typography is in keeping

with modern standards and makes for easy reading. The jacket design and cover are in good taste. *Jock Sutherland: Architect of Men* can be recommended to all sportsmen—and to persons interested in a modern day success story.

Theodore C. Levitas

STANDARD VALUES IN NUTRITION AND METABOLISM

Edited by Errett C. Albritton, M.D. 380 pages with 160 tables. Index. Price $6.50. Philadelphia, W. B. Saunders Co., 1954.

This is a reference book for professional workers doing research in the biological sciences and related fields. It is composed entirely of tables which were developed by 800 specialists. The book was prepared under the direction of the committee on the Handbook of Biological Data, American Institute of Biological Sciences, The National Research Council. The committee is composed of representatives of major fields in plant and animal biology.

Following are the subject headings under which the 160 tables are classified: the nutrients; nutrients utilized by animal forms; nutrients utilized by plant forms; daily nutrient allowances for animal forms; diets, culture media for animal forms; culture media, fertilizers for plant forms; nutrient and energy values of foodstuffs and feedstuffs; nutrient functions and signs of deficiency and excess; pathways of metabolism; end products of metabolism; oxygen consumption, carbon dioxide production; plant tissues, organisms, and energy exchange.

As is evident from these broad headings the book is literally a repository of scientific facts in condensed tabular form. For dental research, as for other investigations involving fundamental biological processes, the book offers documented information difficult to find elsewhere.

Ethel Austin Martin

INTRODUCTION TO MEDICINE FOR DENTAL STUDENTS

By R. W. M. Strain, M.D. 234 pages. Index. Appendix. Price $4. Baltimore, Williams & Wilkins Co., 1954.

This clinical manual of medicine might well have been written in the nineteenth century. It is limited to a discussion of the superficial signs and symptoms of disease and fails to correlate symptoms with the underlying mechanisms. Such correlation gives a sounder basis for understanding disease processes. Neither is there a discussion of the relationship between oral manifestations and systemic disease or systemic manifestations and oral disorders. A clinical outline of common disorders does not constitute an introductory course in dental medicine.

The author seems to believe that inflammation is the primary consideration in disease. Actually, the advances of the last half century have indicated many other causes for bodily disease such as poor nutrition, allergy, disorders in metabolism and psychosomatic disturbances. In the chapter on blood disorders there is no mention of the fact that hemorrhagic symptoms may foreshadow true hemorrhagic blood disease or hemorrhagic vascular disorders. Then, too, monocytic anemia is heralded most often by inexplicable pain in the gingiva and teeth, yet the author omits mentioning this type of leukemia.

The chapter on endocrine diseases omits discussion of the thyroid and pituitary disorders so often responsible for maldevelopment of the mouth. Nevertheless, the book represents a readable approach to the panorama of common disorders observed in everyday practice. Apparently, the author preferred to reveal the essentials of medicine from the physician's standpoint rather than from that of the dental practitioner.

I. Newton Kugelmass

HEALTH YEARBOOK 1954

By Oliver E. Byrd, M.D. 325 pages. Index. Price $4.50. Stanford, Calif., Stanford University Press, 1954.

The *1954 Health Yearbook* contains 268 abstracts of articles from scientific journals and other periodicals. The book would seem particularly helpful to those health workers who have neither the time nor the periodicals available for keeping informed on a myriad of health topics.

Abstracts are listed under 21 chapter headings such as: "Health as a Social Accomplishment," "Health as a Social Problem," "Mental Health and Disease," "Health Services and Facilities," "School Health," and "Trends and Possibilities."

Of particular interest to the dentist are the eight articles relating to dental health: "Dental Injuries in Football," "The Origin of Dental Fears," "Faulty Teeth Due to Inheritance of Protruding Jaws," "An Effective Method of Oral Hygiene," "The Woonsocket Dental Pro-

gram," "Dental Education," "Small Town Fluoridation Fight" and "Fluoridation Better Than Expected."

In the abstract "An Effective Method for Oral Hygiene" it is reported, without any supporting evidence, that practically all tooth decay occurs during rest and sleep. Therefore, brushing the teeth before retiring is suggested as the most important procedure in oral hygiene.

Should this article be widely read and accepted it is conceivable that much of the good work which has been done to encourage brushing the teeth immediately after eating could be undone. The inclusion of such an article in the *Yearbook* suggests that perhaps a more effective method of screening dental articles is needed.

P. Sandell

DENTISTRY IN PUBLIC HEALTH

By Walter J. Pelton, D.D.S., and Jacob M. Wisan, D.D.S. Second edition. 282 pages with 54 figures. Index. Price $6.50. Philadelphia, W. B. Saunders Co., 1955.

The publication of the second edition of this book, which is completely revised and rewritten, should be of interest to members of the dental profession as well as to health workers in many different fields. The ten chapters deal with the question of what is public health, surveys and evaluation of dental programs, elements of statistical methods, needs and resources, prevention and control of dental caries and other dental diseases, administrative principles and the practice of dental public health as well as dental health education and the payment for dental services.

Such authorities as John Fulton, John W. Knutson, and Albert L. Russell have contributed some of the chapters. The terminology and style used is such as to make the book suitable for dental and dental hygiene students as a text.

The chapter which deals with statistical methods is understandable and usable as a guide for the correct presentation of dental facts. The chapter on the prevention and control of dental caries, which contains a table of the fluoride content in the various foodstuffs, should be of interest to all, especially those interested in the promotion of water fluoridation. It is hard to single out any one chapter and state that it excels another.

Knowledge in the field of dentistry in public health has made great advances in the six years since the first edition was published. The first edition is most useful for the resource material which it contains, while the second edition has the very latest information in dental public health written in a more understandable manner.

Carl L. Sebelius

ROBERTS' NUTRITION WORK WITH CHILDREN

By Ethel Austin Martin. 527 pages, 19 illustrations. Index. Price $7.50. Chicago, University of Chicago Press, 1954.

This book is a rewritten form of the 1935 edition, but it might almost be said that any resemblance between the two volumes is purely coincidental. However, the purpose and spirit of the book is unchanged. It presents nutrition as it affects children and points out practical ways by which nutrition may be improved. The book deals with specific matters such as teaching a child to like the right foods, the influences of the snack-calories, teenage eating problems, the negative influences of some schools in the nutritional educational programs and motivating children to follow desirable dietary habits.

Although written primarily as a college text, it is an excellent source of current information and program guidance for dentists as well as others interested in promoting good nutrition. One section covers the relation of nutrition to the teeth; references to dental phases are made in a number of other sections. The current knowledge regarding the probable benefits of fluoridation is discussed. The reader is cautioned also that all possible avenues for prevention of dental disease must have full consideration. It is good to find a book whose author considers that the dentist, too, has a part in the cooperative process of determining the total health status of the child.

The selection of materials from the tremendous volume available is excellent. To supplement this selection, each chapter has a bibliography.

Dorothea F. Radusch

PHARMACOLOGY IN MEDICINE—A COLLECTIVE TEXTBOOK

Edited by Victor A. Drill, M.D. 1,197 pages. Index. Price $19.50. New York, McGraw Hill Book Co., Inc., 1954.

This book is formidable in the following respects: its purpose, the number (81) of collaborating authorities in pharmacology, its

size (8½ x 11"), its price and the degree of achievement of its objective. The introductory material on history is interestingly presented, and the "General Principles of Drug Action" is something everyone in the healing arts should read and learn.

A possible objection is that some difference in writing style occurs from section to section. The dental student would do well to learn the basic pharmacology of local anesthesia from this book, but he might find the comparative evaluation of these drugs less than that desired for his needs. The student of pharmacology can rely on the skill and particular experience of the author of each chapter as he summarizes the literature of his subject.

This book is certain to enjoy wide use in teaching because of its scope and expert authorship. It should appeal also to clinicians who wish to know more than the dose and the indications for use of a drug. For instance, the sections on general anesthesia and adjuncts include nine chapters by eight specialists; analgesics are discussed in five chapters by three recognized experts in this field, and chemotherapy is described in 14 chapters by 13 authors.

The emphasis on therapeutics current in dentistry requires a reliable, modern and complete source of information. Dr. Drill affords this source to the dentist—particularly the dentist who has been out of school for several years. The book is easily read and well illustrated.

Stanley C. Harris

MAKE INFERIORITIES AND SUPERIORITIES WORK FOR YOU

By Samuel Kahn, M.D. 184 pages. Index. Price not listed. Ossining, N. Y., Dynamic Psychological Society Press, 1954.

This volume is intended to be a practical book written for the purpose of understanding, preventing and treating feelings of inferiority. Sources of such feelings, characteristics, manifestation and handling are discussed.

The author believes that the foundation for inferiority feelings is laid in childhood. A section on psychosomatic dentistry written by a dentist illustrates that at this time, dental problems, if not properly handled, may have psychological effects. Among these problems are caries, extraction and replacement of teeth, as well as malocclusion and conditions of traumatic origin which caused fracture or loss of teeth between the ages of four and 16. The author is careful to emphasize that it is not only the conditions themselves which produce feelings of inferiority but the quality of interpersonal relationships caused by these conditions. Thus what is said in the presence of a child patient about his dental condition may eliminate or produce feelings of inferiority. Since the time that Adler stressed the concept of "inferiority feelings" to explain certain mechanisms of behavior, much literature and research have been devoted to this subject. The author, a psychiatrist, has gathered data from clinical observations and examples of well-known historical figures in an attempt to substantiate this concept. Those who are empirically oriented may question some of his generalizations. From the viewpoint of dentists, psychoanalytic terminology may make for difficulty in understanding of the text.

Susan Young

TEXTBOOK OF BIOCHEMISTRY

By Edward Staunton West, Ph.D., and Wilbert R. Todd, Ph.D. Second edition. 1,356 pages with illustrations. Index. Price $12. New York, The Macmillan Co., 1955.

This publication follows the classical presentation of subjects found in most biochemical texts. Emphasis is placed on physical chemistry concepts. Topics are presented in great detail and in some instances have received disproportionate emphasis. Some 140 pages are devoted to principles of physical chemistry previously discussed in a text on this subject by one of the authors. However, only 50 pages are devoted to a discussion on enzymes. The chemistry of bones and teeth comprise six pages. In general the material in this section and the section on saliva and fluoride does not reflect the recent literature.

Sections on general and classical subjects such as intermediary metabolism have been meticulously treated and refer to the very recent literature. Thus reference is made to the work done in 1953 by Horecker and others on an alternate pathway in carbohydrate metabolism and to the work of Meister and others done in 1954 on the role of transaminase in amino acid metabolism.

In general, the format of the text is excellent. The type size, paper and binding are good. Few illustrations are found, but frequent and appropriate tables and graphs are presented. Unfortunately, a few of the figures are too crowded and detailed for easy perusal.

In conclusion, the treatment of classical material is detailed and accurately documented. Less familiar subjects are not treated

according to the more recently published literature. Although the rather exhaustive treatment of the subject matter renders its digestion by the beginning student somewhat laborious, it should serve as an excellent reference text for the instructor preparing lecture notes in the subject, and it should prove invaluable for the biochemists of specialized fields, who constantly require a ready reference to biochemical fields of related interest.

Isadore Zipkin

BOOKS RECEIVED BUT NOT REVIEWED

VIRAL AND RICKETTSIAL DISEASES OF THE SKIN, EYE AND MUCOUS MEMBRANES OF MAN • By Harvey Blank, M.D. and Geoffrey Rake, M.D. 285 pages with illustrations. $8.50. Little, Brown and Co., 34 Beacon St., Boston, 1955.

A REPORT ON THE NATIONAL MANPOWER COUNCIL • By Columbia University. 48 pages. Graduate School of Business, Columbia University, New York, 1954.

WOMEN IN THE MOSLEM WORLD • By Madame Ahmed Hussein. 29 pages with illustrations. Press Department, Egyptian Embassy, 2310 Decatur Place, N.W., Washington, D. C., 1954.

W. K. KELLOGG FOUNDATION REPORT FOR 1953-1954 • 127 pages with illustrations. W. K. Kellogg Foundation, Battle Creek, Mich., 1954.

BULLETIN OF THE MILLARD FILLMORE HOSPITAL • Volume 2. 160 pages with illustrations. Millard Fillmore Hospital, 875 Lafayette Ave., Buffalo, 1954.

THE NUFFIELD FOUNDATION: REPORT FOR THE YEAR ENDED 31 MARCH 1954 • 141 pages. Nuffield Foundation, Nuffield Lodge, Regent's Park, London, N.W.1., 1954.

THE NUFFIELD FOUNDATION: REPORT ON GRANTS MADE DURING THE TEN YEARS, APRIL 1943 TO MARCH 1953 • 319 pages. Nuffield Foundation, Nuffield Lodge, Regent's Park, London N.W.1, 1954.

CONNECTIVE TISSUES. TRANSACTIONS OF THE FIFTH CONFERENCE, FEBRUARY 8, 9 AND 10, 1954, PRINCETON, N. J. • Edited by Charles Ragan, M.D. 222 pages with illustrations. $4.25. Josiah Macy, Jr. Foundation Publications, P.O. Box 575, Packanack Lake, N. J., 1954.

THE ROCKEFELLER FOUNDATION ANNUAL REPORT, 1953 • 482 pages with illustrations. Rockefeller Foundation, 49 West 49 St., New York.

Current Literature

ADVANCES IN MAXILLOFACIAL SURGERY DURING THE PAST HALF CENTURY

Varaztad H. Kazanjian. J. Oral Surg. 13:97 April 1955.

Various methods for the treatment of wound infection have been developed between the Listerian period and the present time. The advances made between World War I and II have been of paramount importance; among them are the prevention of surgical shock, the use of blood and plasma and the discovery of antibiotics, a discovery which ranks in importance with the introduction of general anesthesia in the nineteenth century.

The present method of treatment of wounds makes use of primary suturing and late suturing. Special conditions exist in the treatment of maxillofacial injuries.

The greatest of the early contributions made by the dental profession in the surgical treatment of maxillofacial bone injuries was the fundamental concept that broken jaw fragments should be immobilized in the proper occlusal relationship to insure the proper function of the jaws later on and to offset facial disfigurement. More recent contributions have been the specialized dental splints evolved for immobilizing the jaws, using the teeth as points of anchorage. These splints are a refinement of earlier technics.

Advances made in the treatment of maxillofacial deformities in the last half century are the result of investigations and the intelligent use of skin grafts, pedicled flaps, bone grafts and prosthetic devices.

RADIO-OSTEOMYELITIS OF THE JAW

Harry M. Seldin, S. Daniel Seldin, William Rakower, and Abbe J. Selman. J. Oral Surg. 13:112 April 1955.

The intense radiation employed in treating certain oral malignancies may lead to devitalization of bone and altered histologic structure of the surrounding soft tissues. Impairment of reparative abilities and lowering of resistance to infection occur. Infection superimposed on radiation necrosis of the jaw bone differs from osteomyelitis in bone not previously irradiated by being more severe, intractable and persistent. This condition, which is best identified by the term "radio-osteomyelitis" is characterized by most, or all, of the following symptoms: pain, swelling, trismus, oral exposure of necrotic bone with delayed sequestration, abscess and sinus formation, pathologic fracture and slowness of repair. Two representative cases are reported, and prevention and management are discussed.

Infected and carious teeth and teeth in line of irradiation should be extracted prior to administration of radiation therapy for oral malignancies. An adequate postextraction healing period is necessary before radiation therapy is begun. After irradiation, every effort must be made to avoid trauma and infection of the irradiated tissues. Unavoidable extractions should be performed with extreme care and delicacy and full antibiotic therapy should be utilized.

Radio-osteomyelitis should be treated palliatively. A rigid program of oral hygiene is necessary. Because the condition is usually protracted, analgesics rather than narcotics should be relied on for relief of pain. Intractable pain may be treated by nerve block with alcohol or local anesthetics. Sharp ends of exposed and necrotic bone may be clipped off with rongeur forceps. Sequestrums are removed only when they are completely separated. When the necessity for antibiotics arises, they should be used liberally.

RECTAL THIOPENTAL SODIUM ANESTHESIA FOR THE AMBULATORY CHILD PATIENT

Stanley J. Behrman, Howard J. Mark and Alfred A. Brown. J. Oral Surg. 13:125 April 1955.

The fears and phobias, anxieties and resentments which some patients bring with them to the dental office frequently are related to the psychic trauma of an operation performed in childhood. Unfortunately, the agents and technics in use today for anesthetizing the ambulatory child dental patient are injurious psychologically. Rectal administration of thiopental sodium eliminates the crying and struggling produced by a needle puncture, masks and irritating inhalants. A technic is used with which every child is familiar—the taking of temperature rectally.

A 10 per cent solution of thiopental sodium is prepared by emptying a 3 Gm. ampule into 1 ounce of tap water. For every kilogram (2.2

pounds) of body weight 0.4 cc. are administered. The solution is drawn into a 20 cc. syringe to which is attached a soft rubber catheter. The child, accompanied by a parent, is placed on his side on a cart or table. The catheter is inserted into the rectum and the solution instilled. Within two to five minutes the child is asleep, and any remaining solution is withdrawn. Local anesthesia is infiltrated and the surgical procedure performed. Recovery is smooth and uneventful.

In the reported series of 83 children, all had amnesia. There was no evidence of excitement stage and no laryngeal stridor. Nausea and vomiting were at a minimum. All children could walk out of the office within an average of 34 minutes. Sixteen of the patients required supplementary anesthesia with an inhalant (vinyl ether), but none of the children had any recollection of this.

The procedure is simple and provides safe, effective anesthesia with a minimum of psychic trauma. At the New York Hospital dental clinic and in the private practice of the senior author, this technic is routine for all children up to the age of ten.

ODONTOGENIC MYXOFIBROMA OF THE MANDIBLE

James R. Hayward. J. Oral Surg. 13:149 April 1955.

An unusual case is reported which illustrates the aggressive behavior of a connective tissue neoplasm which has benign histopathologic features.

A four year old boy developed a persistent swelling in the right side of the mandible in the region of a developing permanent first molar. After one preliminary biopsy, the patient received first treatment. At this time the lesion had been present for six months. The first operative procedure was an intraoral excision of a tumor mass which was reported as myxofibroma. Although the operative defect showed signs of healing, a recurrence of the tumor and a pathologic fracture of the mandible in this region were noted four months after the first operation. Repeated biopsies before operative procedures showed the existence of identical histopathologic features, without any change indicating malignant characteristics. In addition there was no sign of regional or remote metastasis of the tumor. Roentgenograms showed progressive destruction of the mandible in this region.

At the time of the second operation, a block excision was carried out to remove a section of the mandible from a point just below the sigmoid notch to the region posterior to the mental foramen. The tumor was found to invade the submaxillary gland and the regional musculature, which were excised in block. A stainless steel plate was inserted in order to maintain the position of the condyle by uniting it with the remainder of the mandible. This procedure was carried out as a temporary measure. It was contemplated that bone graft reconstruction would be undertaken after a sufficient time had elapsed to assure control of the neoplasm. Six months after the second operation there was no evidence of recurrence or metastasis of the tumor. Repeated confirmation of pathological diagnosis and preservation of mandibular function are important.

ODONTOMA—COMPLEX TYPE: REPORT OF CASE

Leroy C. Andersen. J. Oral Surg. 13:156 April 1955.

A young woman, aged 22, was referred for treatment because of pain and discomfort from a swelling of the face.

Questioning and clinical examination revealed the following: the swelling in the left mandibular region had been gradual; lower left first, second and third molars were absent; the mandible in this area was greatly enlarged in all directions. It was hard but not crepitant.

The roentgenographic examination (periapical, occlusal and extraoral views) recorded an opaque mass that protruded on the lingual side, extended from the ridge in the molar region downward toward the inferior border of the mandible and engulfed the crown of an incompletely developed third molar, the root of which was very near the inferior border of the mandible. The tooth was being forced through the inferior border of the mandible by the continuous growth of the mass.

Signs of increasing acute infection indicated immediate intervention. The premedicants administered were morphine and atropine. Anesthesia was induced by mandibular and long buccal block with intermittent use of nitrous oxide-oxygen analgesia. The operative region was exposed intraorally. The tumor mass was carefully dissected out a section at a time. In this way, the third molar was exposed and was then removed. The mandibular nerve trunk was visible. The usual postoperative care was given. Recovery was uneventful, except for slight paresthesia.

Microscopic examination of the tumor revealed it to be made entirely of calcified masses which were recognizable as dentin and

cementum. The diagnosis was odontoma—complex type.

The interesting feature of this case was that the force from the growth of a mass of hard pathologic tissue was causing the abnormal and external eruption of a normal tooth.

DENTIGEROUS CYST OF THE MANDIBLE: REPORT OF A CASE

Martin S. Protzel. J. Oral Surg. 13:159 April 1955.

On March 27, 1948, a 37 year old woman was referred for diagnosis and treatment. Her chief complaint was pain and swelling on the right side of the face and neck. Examination revealed a firm swelling of the face involving the angle, body and symphysis on the right side of the mandible. A collateral edema extended to the hyoid bone. Considerable tenderness was noticeable during palpation of the involved region. Intraorally the mucosa appeared to be of normal tone and texture. Palpation at a site just anterior and inferior to the second molar produced pain.

The history of illness began two weeks previously with the presence of a painful nodular swelling at the body of the right side of the mandible. There was no history of trauma.

Roentgenographic examination revealed an impacted anomalous mandibular molar tooth at the lower border of the mandible posterior to the mental foramen and anterior to the mesial root of the second molar. A radiolucent area extending superiorly to the oral mucosa was seen about the coronal aspect of the impacted tooth. Diagnosis of an impacted anomalous tooth with an associated dentigerous cyst was made.

Treatment consisted of premedication prior to surgery in the form of 50 mg. of meperidine hydrochloride, and scopolamine 1/150 grain. Nitrous oxide-oxygen-ether was administered and nasopharyngeal catheters were inserted when the surgical plane of anesthesia was reached. Because of the position of the impacted tooth at the lower border of the mandible, an extraoral approach was employed. An incision was made through the skin, platysma muscle, fascia and periosteum. An automatic chisel was employed to create a bone window. This procedure exposed the impacted tooth which then was split horizontally. The crown and roots were elevated separately. A greyish-blue gelatinous soft tissue mass lying above the coronal aspect of the tooth was excised. The tissue was preserved in Formalin 10 per cent for microscopic study. The edges of the bone defect were carefully smoothed, and the wound was irrigated with a penicillin-saline solution. The fascia, platysma muscle and subcutaneous tissue were united with no. 000 interrupted catgut sutures. The skin was united with si:: no. 000 interrupted silk sutures.

The postoperative course was uneventful. On the fourth day postoperatively the skin sutures were removed. At the end of six weeks a fine pink linear scar, well hidden by the lower border of the mandible, was visible. A roentgenogram taken three years later revealed that the surgical region had filled in with regenerated bone.

Microscopic examination of the excised soft tissue mass revealed a dentigerous cyst with ameloblastomatous changes.

INTRAVENOUS ANESTHESIA IN OFFICE PRACTICE

Harold W. Krogh. J. Oral Surg. 13:138 April 1955.

Many problems are encountered in administering general anesthesia in the office. Intravenous barbiturates can be utilized to help solve these problems. Certain principles underly the successful use of all general anesthetics.

Careful consideration must be given to premedication, induction, maintenance, post-anesthetic care and postoperative medication. Several methods exist for producing surgical anesthesia with the barbiturates alone or in combination with the inhalants and intravenous drugs.

Intravenous anesthesia offers the solution to many problems of dental anesthesia. The intravenous drugs are best used in the primary role with secondary drugs, if any, carefully chosen to meet the physiological needs of the patient. The material presented offers evidence that the intravenous method is firmly based and deserves extended use.

JOURNAL OF DENTAL RESEARCH
February 1955

MORPHOLOGIC EFFECTS OF IRRADIATION ON THE SALIVARY GLANDS OF RATS

James A. English, p. 4.

Morphologic alteration occurs within 16 days in the salivary glands of white rats after dosage of 1,000 to 1,500 roentgens of 200 kilovolt

peak radiation (25 ma., ¼ mm. Cu. 1 mm. Al. filter, 0.82 mm. Cu.hvl, 50 cm. tad, 44 r per min.). The changes consist primarily of alteration in size, shape and staining characteristics of nuclei in acinar cells of the submaxillary salivary glands. Changes were observed with less regularity in the parotid and greater sublingual glands. The experimental period investigated was 16 hours to 100 days after radiation; 162 rats were used, 72 of them as littermate controls.

ELECTROPHORESIS IN DENTIN WITH RADIOACTIVE CALCIUM

Robert E. Sausen, p. 12.

The topical application of drugs to a tooth surface can be more effective if speed and depth of penetration are increased. A direct electric current can increase speed and depth of penetration for an electrolytic solution. Different concentrations of radioactive calcium solutions were placed in shallow cavities of dog's teeth. The teeth were subjected to various current strengths for different amounts of time. Results were observed from 0.5 mm. ground sections on radioautographs. For orientation purposes the beta radiation images were superimposed on soft roentgenograms of the tooth section.

An application of 0.5 milliampere-minute brings a visible amount of calcium to the pulpal wall. The path of this movement is limited to tubules cut in the cavity preparation. The calcium appears uniformly distributed at first. Further treatments result in accumulation of ions at the pulpal wall and lateral borders, these ions finally saturating all of the involved dentin. A maximum measurable concentration is obtained in 20 milliampere-minutes. Penetration occurs more quickly with higher concentrations of calcium or higher current strength; however, there is destruction of odontoblasts with currents above 1 milliampere.

AUTORADIOGRAPHIC DETECTION OF RADIOSULFATE INCORPORATION BY THE GROWING ENAMEL OF RATS AND HAMSTERS

Leonard F. Bélanger, p. 20.

Radiosulfate administered subcutaneously to young rats and hamsters has been detected radioautographically in the ameloblasts and new enamel during the period of growth. The radiosulfate seems to be synthetized into an acid sulfomucoprotein, which appears in the matrix before keratin and progressively disappears.

This substance is acid fast and hyaluronidase resistant. When present in large amounts, it may be an inhibitor of mineralization. Its formation and secretion are concomitant with alkaline phosphatase activity.

During the maturation period of the enamel, a concentration of S^{35} appears at the dentinoenamel junction and diffuses upward, probably from the dentin. This S^{35} might represent an invasion of sulfopolysaccharides favoring mineralization.

TIME STUDIES OF THE PENETRATION OF EXTRACTED HUMAN TEETH BY RADIOACTIVE NICOTINAMIDE, UREA, THIOUREA, AND ACETAMIDE. II. PENETRATION OF DENTIN FROM THE PULP CHAMBER

W. W. Wainwright and H. H. Belgorod, p. 28.

Isotope-labeled solutions of nicotinamide, urea, thiourea and acetamide were tested for their ability to penetrate dentin by placing them in the cleaned pulp chambers of extracted human teeth. Twenty-one unfixed and five Formol-fixed teeth were treated, stored in a humid atmosphere, and, after periods of six minutes to three days were sectioned under oil and examined radioautographically. C^{14}-nicotinamide, C^{14}-urea, S^{35}-thiourea and C^{14}-acetamide penetrated dentin rapidly. Each compound penetrated through approximately 3.5 mm. of dentin to reach the dentinoenamel junction in about 20 minutes. Acetamide penetrated through the dentin (4.1 mm.) and faintly through the enamel (2.1 mm.) within 22 minutes at 37°C.

A STUDY OF THE ULTRASTRUCTURE OF CHALKY WHITE ENAMEL

Howard M. Myers, p. 38.

Chalky white enamel which selectively retains topically applied F^{18} is identifiable under a polarizing microscope by its altered birefringence. Islands within chalky enamel exhibit imbibition of liquids. Positive form birefringence has been identified in these regions. This indicates the presence of submicroscopic spaces at these sites.

Enamel which is unaltered in gross or microscopic appearance and does not exhibit preferential retention of topically applied F^{18} shows no areas of form birefringence. The presence of submicroscopic spaces may be related to the selective uptake of fluoride ions by chalky enamel.

THE MECHANISM OF HYGROSCOPIC EXPANSION IN DENTAL CASTING INVESTMENTS

H. W. Lyon, George Dickson and I. C. Schoonover, p. 44.

One of the methods used to produce the expansion of dental investments necessary to compensate for the casting shrinkage of gold alloys consists of placing the mold in water during the setting period. On the basis of the data presented, it is believed that hygroscopic expansion of dental investments is a continuation of the normal setting expansion during the period when the investment is in a semisolid state. The introduction of additional water causes hygroscopic expansion by permitting further hydration of the calcium sulfate. The inert filler present in the investment serves to weaken its structure and thus permits the precipitating hydrate crystals to expand the mass of material.

MEASUREMENT OF THE ELECTRIC CONDUCTIVITY OF DENTAL CEMENT. II. VALUES FOR SPECIMENS EXPOSED TO MOISTURE

Lloyd J. Phillips, Richard J. Schnell, Robert Johnson and Ralph W. Phillips, p. 51.

Previous tests showed zinc phosphate cement to be an effective electric insulator when maintained in a dry condition. This investigation has indicated that its insulating ability is questionable if the cement is exposed to moisture. The resistance pattern of wet cells is entirely different from that of dry cells.

The resistance of the cement was found to be a function of the contact area; the larger the area, the less the resistance. However, the variation in surface area which occurs in the clinical restoration probably does not significantly alter the insulating characteristics of the cement.

The resistance varied in respect to the temperature at which the cell was maintained. Temperature fluctuation during the investigation was not great enough, however, to alter materially the values observed.

REACTIONS OF FLUORIDE ION WITH POWDERED ENAMEL AND DENTIN

Harold G. McCann and Frederick A. Bullock, p. 59.

Samples of powdered, fat-free, unashed samples of enamel and dentin were treated with sodium fluoride solutions over the range 2 ppm to 2 per cent fluoride. Analysis of the solid and liquid phases enabled calculations to be made that indicated the types of reactions which had taken place. Fluoride ion reacts with dentin or ions eluted or dissolved from dentin in several different ways; namely, (1) possible exchange with carbon dioxide on the crystal surface, (2) direct adsorption, (3) precipitation as magnesium fluoride of the magnesium released from crystal surfaces, (4) double decomposition at high fluoride levels to form calcium fluoride and (5) formation of fluorapatite by exchange with hydroxyl ion. Enamel reacts to fluoride ion in a similar manner but the reaction is much more limited in extent. The approximate amount of fluorine contributed by each of these reactions has been estimated. It is shown that principal reaction up to 100 ppm fluorine is the formation of fluorapatite in enamel, dentin and in synthetic hydroxyapatite.

EFFECT OF pH AND STATE OF OXIDATION OF DIFFERENT FLUORIDES IN THE DRINKING WATER ON DENTAL CARIES AND FLUORINE STORAGE IN THE RAT

Joseph C. Muhler and Harry G. Day, p. 68.

When rats were given stannous fluoride and stannous chlorofluoride each day in oxygen-free drinking water at a fluorine concentration of 20 micrograms per milliliter, and at pH 3.5, these fluorides were decidedly more effective in reducing the initiation and extension of dental caries than was sodium fluoride at the same pH. However, the effectiveness of the stannous fluoride and the stannous chlorofluoride is decreased when the pH is increased to 5.5. Sodium fluoride is not affected to the same degree.

The degree of dental caries resistance does not seem to be related to the storage of fluorine in the femur, and the pH of the fluoride solution apparently is not related to its storage.

THE EFFECT OF TOPICAL FLUORIDE ON DENTAL CARIES EXPERIENCE IN ADULT FEMALES OF A MILITARY POPULATION

William J. Carter, Philip Jay, Irving L. Shklair and Lewis H. Daniel, p. 73.

Most investigators report no reduction in dental caries experience in adult dentition when the teeth are treated topically with a 0.2 per cent sodium fluoride solution. In the present study 60 Navy enlisted women received topical applications of a 0.2 per cent neutral sodium fluoride solution, and the teeth of 88

women, serving as a control group, were treated with 0.9 per cent sodium chloride.

Caries experience was tested by clinical and roentgenographic examination. In addition, salivary lactobacillus counts were made on each person. No significant reduction occurred in the caries experience of persons receiving the sodium fluoride treatment over those receiving a placebo. There was no apparent effect on the salivary lactobacillus counts.

THE EVANSTON DENTAL CARIES STUDY. XI. THE CARIES EXPERIENCE RATES OF 12, 13 AND 14 YEAR OLD CHILDREN AFTER EXPOSURE TO FLUORIDATED WATER FOR 59 TO 70 MONTHS

Iden N. Hill, J. R. Blayney and Walter Wolf, p. 77.

A comparison is made of the caries experience rates found in 12, 13 and 14 year old Evanston children before the fluoridation of the communal water supply (1946) with that found after 59 to 70 months of exposure to water containing 1.0 ppm fluoride.

When the caries experience is expressed as the DMF tooth rate per 100 children, it is shown that the teeth of 12 year olds had a reduction of 21.79 per cent, the 13 year old children experienced a reduction of 21.21 per cent and the 14 year age group had a reduction of 12.53 per cent. In addition, a statistically significant reduction in occlusal surface pit and fissure caries or fillings of permanent molars and an increase in the number of occlusal surfaces of molars free from caries or fillings is reported.

When the caries experience is expressed as DMF tooth surfaces rate per 100 children, a reduction is found of 21.10 per cent, 20.98 per cent, and 7.62 per cent for the 12, 13 and 14 year age groups respectively.

RESULTS OF AN EIGHT YEAR STUDY OF THE EFFECTIVENESS OF CARBOHYDRATE RESTRICTION IN REDUCING SALIVARY LACTOBACILLUS COUNTS

Paul C. Kitchin and Dorothy Permar, p. 89.

Over an eight year period, the caries control laboratory of the College of Dentistry of Ohio State University studied the effect of dietary sugar restriction on the salivary lactobacillus counts of 1,089 patients. The results obtained in the dietary treatment for reducing salivary lactobacillus counts as a means of controlling dental caries activity compare favorably with those published by Jay for a Michigan study.

In every instance where careful investigation of the diet of patients under treatment was possible, failure of the salivary lactobacillus count to decline was associated with failure of the patient to refrain from eating sucrose.

DENTAL CARIES AND GINGIVITIS IN TEL AVIV, ISRAEL

M. Laufer, p. 94.

THE PRODUCTION OF ERYTHEMA OF THE SKIN BY EXPOSURE TO X-RAY RADIATION

Albert G. Richards, p. 100.

Experiments performed on human skin irradiated with a modern dental x-ray machine indicate that an erythema of the skin on the flexor surface of the forearm can be produced by an exposure of 600 milliampere seconds ("165 r in air"). Such exposure produced an erythema on three out of four patients. The least exposure required to produce an erythema on anyone in these tests was 425 milliampere seconds.

The erythema appeared in two to eight hours after the skin was exposed and remained visible until the third to fifth day, at which time tanning or pigmentation replaced the erythema. The phase of pigmentation was of four to 18 weeks' duration.

Alopecia did not develop at any time in the test sites. In recognition of the fact that the skin of the face is less sensitive to roentgen radiation than the skin on the flexor surface of the forearm, it is recommended that no single area of the face be exposed at a 7½ inch target-skin distance to more than 400 milliampere seconds ("110 r in air") in any two week period.

SIMPLIFIED METHODS FOR DETERMINATION OF CALCIUM AND MAGNESIUM IN THE SALIVA

Yngve Ericsson, p. 104.

Salivary calcium and magnesium can be conveniently determined on small samples by titration with ethylene diamine tetraacetate, using Eriochrome Black T as indicator. Titration of magnesium separately after precipitation of calcium as the oxalate gave unsatisfactory results because the concentrations of unprecipitated calcium were often great in comparison with the magnesium concentrations of saliva. Salivary magnesium can be determined colorimetrically with titan yellow

after precipitation of interfering calcium as the oxalate. Analytical series revealed lower values than have been reported previously for salivary magnesium.

MICROBIOLOGIC DIFFERENCES IN THE ORAL CAVITIES OF THE HUNT-HOPPERT CARIES-RESISTANT AND CARIES-SUSCEPTIBLE RATS

S. Rosen, M. A. Benarde, H. R. Hunt and C. A. Hoppert, p. 113.

A study to determine differences in the oral microflora of the Hunt-Hoppert caries-resistant and caries-susceptible rats was carried out. Many types of bacteriologic media were used. Only by the use of highly selective media for lactobacilli and streptococci was it possible to detect any differences between the oral microflora of the two strains of rats. These media were tomato juice agar, lactobacillus-selection medium and mitis salivarius agar. Lactobacilli and *Streptococcus salivarius* were recovered more frequently from the caries-susceptible animals.

THE ACTION OF ORAL BACTERIA ON COLLAGEN

R. B. Lucas and J. C. Thonard, p. 118.

One hundred and nine strains of microorganisms were isolated from the gingival pockets of 12 patients with periodontal disease and the gingival sulci of six healthy persons. Fifty-six of these strains were found to disintegrate collagen (azocoll was used as the source of collagen); this fact indicates that many of the oral organisms commonly regarded as purely commensal are in fact potential pathogens.

THE LOCALIZATION OF POLYSACCHARIDES IN DEVELOPING TEETH

Gerrit Bevelander and Percy L. Johnson, p. 123.

Acid polysaccharides identified by means of metachromatic dyes were observed in the ground substance of the dental pulp and the stellate reticulum of the enamel organ. Predentin and preenamel stain metachromatically; newly calcified increments of these tissues stain orthochromatically. More highly calcified increments do not stain at all.

Mucopolysaccharides occur in practically all components of the developing tooth. The odontoblasts and ameloblasts show a high mucopolysaccharide content during their functional period. Calcified dentin also shows an intense coloration. Sections treated with hyaluronidase show a loss of metachromatic staining properties in the ground substance of the stellate reticulum. Other components of the developing tooth are not appreciably affected.

HISTOCHEMICAL REACTIONS OF THE LAMPREY MOUTH

Reidar F. Sognnaes and Leopold Lustig, p. 132.

The oral tissues of freshly killed lampreys, obtained from the Exeter River in New Hampshire, were dissected and placed in various fixatives for morphological and histochemical observations. The most comprehensive studies were made with regard to the histochemical reactions associated with the formation of the horny "teeth" situated along the buccal mucosa and on the tongue of the lamprey.

The first evidence of cornification was associated with the deposition of sulphydryl positive granules in the cytoplasm of the squamous epithelial cells adjacent to the horny groove. This process was accompanied by an intense alkaline phosphatase reaction but not by the deposition of minerals. As the horny caps became denser, a positive reaction for disulfid bonds became evident, accompanied by brilliant birefringence when examined with polarized light.

Adjacent to the horny caps, the squamous epithelial cells reacted for glycogen in the prickle cell layer, and near the surface, where production of a mucous rather than a keratinous substance was in evidence, a strong metachromatic and basophilic reaction was observed. Further work is suggested regarding the histochemical reactions accompanying deposition of calcium phosphate in the teeth of intermediary species in the evolutionary scale.

GLYCOGEN CONTENT OF PERIODONTAL TISSUE. II. CORRELATION WITH TYROSINE CONTENT

B. K. Forscher, A. G. Paulsen and W. C. Hess, p. 144.

In order to determine whether the variations found in glycogen levels in gingival tissue in various stages of periodontal disease were real or resulted from experimental artefact, gingival tissue was analyzed for glycogen and tyrosine.

Tyrosine levels were found to be constant, while glycogen levels varied, indicating that the glycogen variations are true findings.

An equation was derived relating per cent glycogen to total milligrams glycogen and total milligrams tyrosine in the sample.

Deaths

Alvarez, George G., Philadelphia; School of Dentistry, University of Pennsylvania, 1917; died February 10.

Anderson, Charles R., Springfield, Mass.; Dental School, Tufts College, 1919; died February 2; aged 57.

Asbel, Julius, St. Petersburg, Fla.; New York College of Dentistry, 1908; died December 11; aged 76.

Bade, Henry, Brooklyn; New York College of Dentistry, 1897; died January 22; aged 78.

Barnard, William E., New York; School of Dentistry, University of Pennsylvania, 1890; died January 7; aged 85.

Bedford, Victor E., Eaton, Ohio; College of Dental Surgery, University of Michigan, 1899; died January 4; aged 79.

Begin, Arthur A., Dorchester, Mass.; Baltimore College of Dental Surgery, University of Maryland, 1926; died October 26; aged 53.

Bethea, J. Thomas, Madison, Ga.; Atlanta Dental College, 1895; died January 16; aged 87.

Boyd, John J., Covington, Tenn.; School of Dentistry, Vanderbilt University, 1899; died February 1; aged 78.

Browne, Lex R., Clearfield, Pa., Philadelphia Dental College, 1904; died February 4; aged 73.

Bruce, Robert F., Onaway, Mich.; Department of Dental Surgery, Detroit College of Medicine, 1904; died December 16; aged 79.

Buell, Anna M., Denver; School of Dentistry, University of Denver, 1911; died January 20; aged 79.

Charmbury, Thomas H., Hanover, Pa.; Dental Department, Baltimore Medical College, 1900; died December 18; aged 79.

Clark, Clifford F., Menomonie, Wis.; Chicago College of Dental Surgery, Loyola University, 1902; died December 25; aged 76.

Clark, William R., Lincoln, Neb.; Omaha Dental College, 1898; died December 26; aged 79.

Clements, Edmund K., Faribault, Minn.; College of Dental Surgery, University of Michigan, 1886; died February 15; aged 89.

Cline, Franklin J., Covina, Calif.; Baltimore College of Dental Surgery, University of Maryland, 1899; died February 5; aged 79.

Coad, Thomas W., Fond du Lac, Wis.; Dental Department, Milwaukee Medical College, 1905; died February 26; aged 75.

Cohen, Sam R., Wausau, Wis.; Ohio College of Dental Surgery, University of Cincinnati, 1915; died September 15; aged 61.

Cole, Henry F., Minneapolis; College of Dentistry, University of Minnesota, 1922; died December 18; aged 61.

Collier, Lewis G., Hutchinson, Kan.; Western Dental College, Kansas City, 1919; died November 22; aged 59.

Cope, Horace C., McKeesport Pa.; School of Dentistry, University of Pennsylvania, 1902; died February 2; aged 77.

Craig, William H., Batesville, Ark.; School of Dentistry, Vanderbilt University, 1907; died January 17; aged 72.

Cummins, Lawrence C., Cincinnati; Ohio College of Dental Surgery, University of Cincinnati, 1910; died December 31; aged 60.

Deller, Clarence F., Middletown, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1914; died February 27; aged 66.

Dentry, Charles G., Baltimore; Baltimore College of Dental Surgery, University of Maryland, 1916; died September 1; aged 60.

Diehl, Crown O., Hagerstown, Md.; Baltimore College of Dental Surgery, University of Maryland, 1918; died December 30; aged 63.

Dimmich, Clarence R., Williamsport, Ind.; Indiana Dental College, 1919; died February 23; aged 57.

Dippel, Harold C., Boise, Idaho; died November 10; aged 73.

Drummond, Roy J., Greenville, S. C.; Baltimore College of Dental Surgery, University of Maryland, 1910; died February 3; aged 65.

Eaton, John W., Jr., Wellsboro, Pa.; School of Dentistry, Temple University, 1936; died February 4; aged 41.

Eckel, Harry J., Du Bois, Pa.; School of Dentistry, University of Pittsburgh, 1916; died January 29; aged 63.

Edelstein, Martin, Lynbrook, N. Y.; School of Dentistry, Temple University, 1945; died November 14; aged 34.

Edmiston, Richard J., Wewoka, Okla.; died March 11.

Emslie, James M., Albuquerque, N. Mex.; Dental School, Northwestern University, 1952; died December 31; aged 29.

Englander, Elias N., Philadelphia; Pennsylvania College of Dental Surgery, Philadelphia; 1903; died December 23; aged 75.

Engvall, Charles O., Minneapolis; School of Dentistry, Washington University, St. Louis, 1906; died January 8; aged 78.

Field, Bennett A., Cedarhurst, N. Y.; New York College of Dentistry, 1911; died February 17; aged 62.

Finch, Daniel A., Grand Island, Neb.; died November 22; aged 91.

Finck, Nathaniel A., Brookline, Mass.; Dental School, Harvard University, 1907; died April 11, 1954; aged 67.

Fiocca, Joseph V., Norwell, Mass.; Dental School, Tufts College, 1933; died February 1; aged 45.

Fisher, Frederick E., Muskogee, Okla.; died August 5; aged 75.

Folsom, James Y., Marianna, Fla.; Atlanta-Southern Dental College, 1918; died August 26; aged 59.

Freeman, Forrest E., La Porte, Ind.; Indiana Dental College, 1898; died November 25; aged 76.

Gabel, Theodore W.; Lancaster, Pa.; Philadelphia Dental College, 1895; died February 1; aged 83.

Gallagher, Robert J., Blue Earth, Minn.; College of Dentistry, Creighton University, 1915; died December 26; aged 63.

Galvin, Malcom E., Wichita, Kan.; College of Dentistry, University of Illinois, 1927; died February 15; aged 60.

Glascock, Eli H., Richmond, Mo.; died January 1; aged 89.

Glezen, Roy J., Washington, D. C.; School of Dentistry, University of Denver, 1926; died March 15; aged 59.

Goldstein, David B., New York; died March 1; aged 56.

Goulty, Edgar J., St. Paul; College of Dentistry, University of Minnesota, 1934; died November 21; aged 47.

Green, Charles S., Rushville, Ind.; Indiana Dental College, 1906; died January 31; aged 71.

Green, Herman J., Chicago; died December 11.

Greene, Lewis E., Detroit; Dental Department, Meharry Medical College, 1921; died December 27; aged 67.

Gurland, Irving, New York; New York College of Dentistry, 1919; died February 11; aged 58.

Haldeman, William O., Enid, Okla.; Western Dental College, Kansas City, 1902; died September 18; aged 76.

Hall, Alfred D., Jr., Mountain City, Tenn.; College of Dentistry, University of Tennessee, 1948; died January 15; aged 40.

Hampton, Edward B., Bartlesville, Okla.; Kansas City Dental College, 1911; died March 7; aged 82.

Harms, William E., Crossville, Tenn.; Kansas City Dental College, 1917; died December 17; aged 71.

Hartley, Ralph R., Los Angeles; Chicago College of Dental Surgery, Loyola University, 1908; died March 17; aged 74.

Hayes, Carl W., Ellwood City, Pa.; died December 27; aged 66.

Hays, Clifford R., Pasadena, Calif.; College of Dentistry, University of Southern California, 1946; died March 9; aged 32.

Henry, Frederick E., Allentown, Pa.; School of Dentistry, University of Pittsburgh, 1918; died January 29; aged 58.

Henson, Kenneth J., Park Ridge, Ill.; Chicago College of Dental Surgery, Loyola University, 1936; died March 13; aged 44.

Hewitt, Alvin M., Moravia, N. Y.; School of Dentistry, University of Buffalo, 1919; died November 13; aged 60.

Houck, Harry M., Scranton, Pa.; School of Dentistry, University of Pennsylvania, 1901; died December 26; aged 79.

Howard, Waldo J., Houston, Texas; College of Dentistry, Howard University, 1916; died October 9; aged 58.

Ingle, Russell J., Jr., Los Angeles; College of Dentistry, University of Southern California, 1946; died March 9; aged 31.

Kaneko, Yoshio H., Waipahu, Oahu, T. H.; Chicago College of Dental Surgery, Loyola University, 1936; died February 13; aged 45.

Keene, Earl F., Narka, Kan.; Western Dental College, Kansas City, 1911; died February 14; aged 68.

Kitchenman, John, Philadelphia; School of Dentistry, University of Pennsylvania, 1906; died February 2; aged 72.

Knight, Herbert E., Largo, Fla.; Birmingham Dental College, 1905; died March 5; aged 75.

Lages, Charles R., Jr., Richmond Heights, Mo.; School of Dentistry, St. Louis University, 1937; died February 23; aged 40.

Lambert, Horatio S., West Melton, Ohio; died December 16; aged 91.

LeBourgeois, Arthur L., New Iberia, La.; died January 3; aged 57.

Liss, John J., Chicago; Chicago College of Dental Surgery, Loyola University, 1917; died February 23; aged 62.

MacEachern, Charles S., Evanston, Ill.; Dental School, Northwestern University, 1926; died in March; aged 63.

Magill, Frank H., Buffalo; School of Dentistry, University of Pittsburgh, 1904; died February 13; aged 77.

Malony, Fred C., Lincoln, Neb.; College of Dentistry, Creighton University, 1913; died December 2; aged 62.

Martin, William F., Long Beach, Miss.; Louisville College of Dentistry of Centre College, 1905; died December 22; aged 70.

Maxwell, David E., Columbus, Neb.; Lincoln Dental College of Cotner University, 1908; died December 26; aged 71.

Maynard, William T., Milwaukee; Dental School, Marquette University, 1898; died March 10; aged 79.

McGinnis, Charles T., Montclair, N. J.; School of Dentistry, University of Pennsylvania, 1911; died February 21; aged 67.

McQuilkin, Eston R., Pacific Grove, Calif.; College of Dentistry, University of California, 1902; died February 4; aged 78.

Miller, Gove L., Kansas City, Mo.; Chicago College of Dental Surgery, Loyola University, 1898; died December 2; aged 81.

Miller, Joseph R. N., Carnegie, Pa.; Pittsburgh Dental College, Western University of Pennsylvania, 1903; died February 17; aged 77.

Miller, Ralph M., Homestead, Pa.; School of Dentistry, University of Pittsburgh, 1919; died January 6; aged 59.

Mitchell, Lewis M., Austin, Texas; Dental Department, Meharry Medical College, 1917; died December 12; aged 60.

Morse, Thomas D., Lewisville, N. C.; Atlanta-Southern Dental College, 1929; died January 1; aged 51.

Neel, Elmer A., Siloam Springs, Ark.; died July 3, 1954.

Nettleton, George F. V., Manchester, N. H.; Baltimore College of Dental Surgery, 1917; died March 6; aged 63.

Neubauer, Joseph L., Philadelphia; Medico-Chirurgical College of Philadelphia, 1916; died November 24; aged 64.

Newlinger, Arnold J., New York; College of Dental and Oral Surgery, New York, 1916; died February 5; aged 61.

Niemeyer, Leo P., North Hollywood, Calif.; College of Dentistry, University of Southern California, 1927; died February 4; aged 51.

Orwan, Jules, New York; New York College of Dentistry, 1905; died February 8; aged 77.

Owens, Henry F., Monessen, Pa.; College of Dentistry, Howard University, 1918; died January 2; aged 57.

Oxley, Benjamin M., New York; Baltimore College of Dental Surgery, 1890; died January 14; aged 86.

Perry, Myles E., St. Petersburg, Fla.; College of Dentistry, Western Reserve University, 1910; died December 4; aged 69.

Pooler, Carlton F., Hyannis, Mass.; Dental School, Harvard University, 1923; died January 16; aged 59.

Porias, Julius L., Nanty Glo, Pa.; School of Dentistry, University of Pennsylvania, 1917; died February 8; aged 61.

Powell, Winfield W., Philadelphia; Pennsylvania College of Dental Surgery, Philadelphia, 1901; died December 28; aged 77.

Preece, Herbert J., Kingston, Pa.; School of Dentistry, University of Pittsburgh, 1926; died January 23; aged 52.

Rawlins, Leon A., Roodhouse, Ill.; School of Dentistry, St. Louis University, 1908; died October 26; aged 69.

Reid, Percy, Birmingham, Ala.; died December 24; aged 75.

Reiter, Edward, Cleveland; Dental School, Tufts College, 1922; died February 5; aged 59.

Rex, Clifford P., Alamosa, Colo.; School of Dentistry, University of Denver, 1913; died January 10; aged 69.

Rogers, Hugh I., Nashville, Tenn.; School of Dentistry, Vanderbilt University, 1924; died December 23; aged 52.

Ruhland, John J., Milwaukee; Dental School, Marquette University, 1909; died March 11; aged 71.

Rumbaugh, Morris F., Donora, Pa.; Medico-Chirurgical College of Philadelphia, 1916; died February 14; aged 62.

Ryan, Thomas D., Fredonia, Wis.; Dental Department, Milwaukee Medical College, 1901; died October 8; aged 78.

Sanders, Clifford O., Dallas, Texas; College of Dentistry, Baylor University, 1925; died January 30; aged 63.

Sawyer, Pearl W., Lawton, Okla.; died July 7, 1954.

Scalettar, Harry E., Central Islip, L. I., N. Y.; College of Dental and Oral Surgery, New York, 1919; died September 30; aged 57.

Scanlon, Maurice J., Howard Lake, Minn.; College of Dentistry, University of Minnesota, 1930; died November 26; aged 52.

Schnath, George W., Evanston, Ill.; Dental School, Northwestern University, 1935; died January 24; aged 46.

Scholle, Gustav F., Concordia, Mo.; Western Dental College, Kansas City, 1900; died January 24; aged 81.

Shaw, Orrin J., Newport, N. H.; Pennsylvania College of Dental Surgery, Philadelphia, 1900; died January 19; aged 85.

Shultz, Frank H., Washington, D. C.; School of Dentistry, University of Pennsylvania, 1896; died January 30; aged 83.

Sizemore, Henry H., Guin, Ala.; Southern Dental College, Atlanta, 1909; died October 8; aged 71.

Skidmore, Henry S., Rockville Centre, N. Y.; Philadelphia Dental College, 1896; died in December.

Slobod, Lazarus, New York; New York College of Dentistry, 1919; died November 27; aged 72.

Smith, Frank H., Greenwood, Miss.; died December 31; aged 86.

Smith, John A., Durand, Wis.; Dental School, Marquette University, 1926; died November 16; aged 51.

Smith, Robert M., Kalamazoo, Mich.; Department of Dental Surgery, Detroit College of Medicine, 1902; died October 14; aged 77.

Snuffer, Samuel S., Christiansburg, Va.; School of Dentistry, Medical College of Virginia, 1924; died November 13; aged 60.

Solenske, Frank G., Wilkes-Barre, Pa.; Dental School, Marquette University, 1928; died December 17; aged 52.

Sontheimer, Arthur R., Castro Valley, Calif.; died January 17; aged 72.

Spanier, Eugene, Brooklyn; Baltimore College of Dental Surgery, 1943; died December 13; aged 37.

Springer, Gene, Los Angeles; College of Dentistry, University of Southern California, 1949; died January 19; aged 35.

Stanfield, Clyde C., Jellico, Tenn.; College of Dentistry, University of Tennessee, 1932; died November 9; aged 58.

Sterne, Max L., San Diego; died January 15.

Stone, Philip W., Boston; Dental School, Harvard University, 1909; died May 1, 1954; aged 66.

Strange, Algy F., Mount Pleasant, Mich.; Marion-Sims Dental College, St. Louis, 1901; died December 11; aged 75.

Suggett, Allen H., San Francisco; College of Dentistry, University of California, 1893; died March 8; aged 87.

Symmons, Samuel J., Walnut Creek, Calif.; died in November.

Taylor, Richard P., Jacksonville, Fla.; School of Dentistry, University of Pennsylvania, 1899; died February 14; aged 83.

Thompson, Thomas B., Kansas City, Mo.; Kansas City-Western Dental College, 1922; died February 4; aged 60.

Thorburn, Stanley B., South Harpswell, Maine; Dental School, Tufts College, 1904; died February 11; aged 77.

Todd, Clifford, Sacramento, Calif.; College of Dentistry, University of California, 1896; died March 5; aged 81.

Tritt, Francis L., Hays, Kan.; Kansas City-Western Dental College, 1937; died February 10; aged 44.

Trout, Clarence N., Red Lion, Pa.; Philadelphia Dental College, 1903; died January 28; aged 78.

Trowbridge, Leander M., Seattle; Kansas City Dental College, 1901; died February 3; aged 77.

Tyler, Frank G., Jamestown, N. Y.; died November 6; aged 66.

Ulvestad, George E., Chicago; Dental School, Northwestern University, 1912; died January 3; aged 68.

Van Alstine, Elliott, Chicago; Chicago College of Dental Surgery, Loyola University, 1904; died in March; aged 80.

Vanasen, Damon W., San Diego; College of Dentistry, University of Southern California, 1918; died February 7; aged 59.

Walker, John E., Evansville, Ind.; Indiana Dental College, 1912; died November 27; aged 68.

Wallace, Harry T., Detroit; College of Dental Surgery, University of Michigan, 1907; died November 8; aged 73.

Waller, Leo, Bridgeport, Conn.; died October 31; aged 84.

Weaver, Ralph S., Xenia, Ohio; School of Dentistry, Indiana University, 1931; died January 8; aged 62.

Whinery, Vern R., Sioux City, Iowa; College of Dentistry, University of Iowa, 1916; died February 6; aged 61.

Whiting, William H., Barre, Mass.; died September 18; aged 102.

Wilson, David G., Richmond, Va.; died October 22; aged 82.

Wolfson, Bernard, Hopkins, Minn.; College of Dentistry, University of Minnesota, 1922; died November 22.

Wolk, Joseph J., Jamaica, N. Y.; Baltimore College of Dental Surgery, 1915; died January 30; aged 61.

Wood, Ransom K., Toledo, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1902; died January 10; aged 75.

Woolsey, Walter, Avondale Estates, Ga.; New York College of Dentistry, 1887; died February 10; aged 90.

Yetter, Edgar S., Lancaster, Pa.; School of Dentistry, University of Pennsylvania, 1919; died January 10; aged 59.

Young, Frank A., Minneapolis, Kan.; Kansas City-Western Dental College, 1926; died December 29; aged 52.

Younie, James A., Erie, Pa.; Philadelphia Dental College, 1905; died January 16; aged 75.

Zerfing, Wilson, Philadelphia; School of Dentistry, University of Pennsylvania, 1894; died January 13; aged 86.

Zinser, Melford E., Chicago; Chicago College of Dental Surgery, Loyola University, 1919; died January 25; aged 58.

Directory

OFFICERS

Daniel F. Lynch, President.....1678 Primrose Road, N.W., Washington, D.C.
Bernerd C. Kingsbury, President-Elect.....490 Post St., San Francisco
Curtis A. Haggard, First Vice-President.....1202 Huntington Bldg., Miami, Fla.
Frederick W. Herbine, Second Vice-President.....230 N. Fifth St., Reading, Pa.
John E. Fauber, Third Vice-President.....Veterans Administration, Washington, D.C.
Harry Lyons, Speaker, House of Delegates...School of Dentistry, Medical College of Virginia, Richmond, Va.
Harold Hillenbrand, Secretary.....222 E. Superior St., Chicago
C. Willard Camalier, Assistant Secretary.....1726 Eye St., N.W., Washington, D.C.
Louis M. Cruttenden, Assistant Secretary.....222 E. Superior St., Chicago
H. B. Washburn, Treasurer.....Lowry Medical Arts Bldg., St. Paul
Lon W. Morrey, Editor.....222 E. Superior St., Chicago

BOARD OF TRUSTEES

John R. Abel, 1957, Thirteenth District.....405 N. Bedford Drive, Beverly Hills, Calif.
William R. Alstadt, 1957, Twelfth District.....610 Boyle Bldg., Little Rock, Ark.
Percy T. Phillips, 1957, Second District.....18 E. 48th St., New York
Clarence S. Renouard, 1957, Eleventh District.....304 Phoenix Bldg., Butte, Mont.
Howard B. Higgins, 1956, Fifth District.....Montgomery Bldg., Spartanburg, S.C.
L. H. Jacob, 1956, Eighth District.....Jefferson Bldg., Peoria, Ill.
Paul H. Jeserich, 1956, Ninth District.....School of Dentistry, University of Michigan, Ann Arbor, Mich.
Charles H. Patton, 1956, Third District.....235 S. 15th St., Philadelphia
Edward R. White, 1956, Fourth District.....921 Bergen Ave., Jersey City
Earl G. Jones, 1955, Seventh District.....185 E. State St., Columbus, Ohio
A. F. Schopper, 1955, Sixth District.....914 Professional Bldg., Kansas City, Mo.
Charles I. Taggart, 1955, First District.....139 Bank St., Burlington, Vt.
Lewis W. Thom, 1955, Tenth District.....1546 Medical Arts Bldg., Minneapolis

BUREAUS

Dental Health Education: Perry J. Sandell, Director, 222 E. Superior St., Chicago
Economic Research and Statistics: B. D. Moen, Director, 222 E. Superior St., Chicago
Library and Indexing Service: Donald A. Washburn, Director, 222 E. Superior St., Chicago
Public Information: Herbert B. Bain, Director, 222 E. Superior St., Chicago

COUNCILS

Constitution and Bylaws: F. A. Pierson, Chm., 1112 Federal Securities Bldg., Lincoln, Neb.
Dental Education: Philip E. Blackerby, Chm., W. K. Kellogg Foundation, Battle Creek, Mich.
Shailer Peterson, Secy., 222 E. Superior St., Chicago
Dental Health: David W. Brock, Chm., 6026 Enright Ave., St. Louis
R. H. Friedrich, Secy., 222 E. Superior St., Chicago

Dental Research: M. K. Hine, Chm., 1121 W. Michigan St., Indianapolis
H. Trendley Dean, Secy., 222 E. Superior St., Chicago

Dental Therapeutics: Lester W. Burket, Chm., 4001 Spruce St., Philadelphia
J. Roy Doty, Secy., 222 E. Superior St., Chicago

Dental Trade and Laboratory Relations: Walter E. Dundon, Chm., 111 N. Wabash Ave., Chicago
Bernard J. Beazley, Secy., 222 E. Superior St., Chicago

Federal Dental Services: F. J. Reichmann, Chm., Medical Arts Bldg., Oklahoma City, Okla.
Bernard J. Beazley, Secy., 222 E. Superior St., Chicago

Hospital Dental Service: Frank B. Hower, Chm., 814 Heyburn Bldg., Louisville, Ky.
Gerard J. Casey, Secy., 222 E. Superior St., Chicago

Insurance: J. S. Eilar, Chm., 7 Medical Arts Square, Albuquerque, N. Mex.
Paul W. Zillmann, Secy., 29 Walden Ave., Buffalo

International Relations: O. A. Oliver, Chm., 1915 Broadway, Nashville, Tenn.

Journalism: W. L. Barnum, Chm., Morgan Bldg., Portland, Ore.

Judicial: H. B. McCarthy, Chm., College of Dentistry, Baylor University, Dallas, Texas

Legislation: Paul E. Jones, Chm., 3 E. Church St., Farmville, N.C.
Bernard J. Conway, Secy., 222 E. Superior St., Chicago

Membership: J. R. Wallace, Chm., 31 Church St., Winchester, Mass.

National Board of Dental Examiners: Victor L. Steffel, Chm., 19 W. Fifth Ave., Columbus, Ohio
Gerard J. Casey, Secy., 222 E. Superior St., Chicago

Registry of Dental and Oral Pathology: Kurt H. Thoma, Chm., 1180 Beacon St., Brookline, Mass.

Relief: M. C. Hansen, Chm., 420 Seventh St., Racine, Wis.

Scientific Session: Charles S. Kurz, Chm., 550 N. Eighth St., Carlyle, Ill.

SECTION CHAIRMEN

Operative Dentistry: Arne F. Romnes, 55 E. Washington St., Chicago

Oral Surgery and Anesthesia: Samuel A. Brandon, 620 Medical Dental Bldg., Portland, Ore.

Orthodontics and Oral Development: William S. Brandhorst, 4952 Maryland Ave., St. Louis

Pedodontics: Maury Massler, 808 S. Wood St., Chicago

Periodontics: James P. Hollers, 4600 Broadway, San Antonio, Texas

Practice Administration: Hollis A. Askey, 715 Sharp Bldg., Lincoln, Neb.

Prosthodontics, Complete: W. Leslie Warburton, Medical Arts Bldg., Salt Lake City

Prosthodontics, Partial: Otto W. Silberhorn, 311 E. Chicago Ave., Chicago

Public Health Dentistry: George B. Clendenin, 4406 East West Highway, Bethesda, Md.

Research: David F. Mitchell, 3639 47th Ave., S., Minneapolis

Roentgenology: William E. Koch, Jr., 615 Metropolitan Bldg., St. Louis

THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION
222 East Superior Street, Chicago 11, Illinois
WHitehall 4-6730

LON W. MORREY, *Editor* JOHN J. HOLLISTER, *Business Manager*

All expressions of opinion and all statements of supposed fact are published on the authority of the writer over whose signature they appear and are not to be regarded as expressing the views of the American Dental Association, unless such statements or opinions have been adopted by the Association. Articles are accepted with the understanding that they have not been published previously and that they are submitted solely to The Journal. The Journal of the American Dental Association is indexed in the Index to Dental Literature, in the Current List of Medical Literature and, in part, in the Quarterly Cumulative Index Medicus, Biological Abstracts and Chemical Abstracts.

Advertising copy must conform to the official standards established by the American Dental Association. Notice of change of address should be received one month before the change is to be effective. Orders for reprints of Journal articles must be received by the Business Manager's office not later than the 15th of the month of issue in order to secure advantage of the lowest possible prices. Orders received after this date are subject to special quotation.

Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Sixth Annual Session	Oct. 17-20, 1955	San Francisco
Ninety-Seventh Annual Session	Oct. 1-4, 1956	Atlantic City, N. J.
Ninety-Eighth Annual Session	Nov. 4-7, 1957	Miami, Fla.
Ninety-Ninth Annual Session	Nov. 10-13, 1958	Dallas, Texas
One-Hundredth Annual Session	Sept. 21-24, 1959	New York

MEETINGS OF CONSTITUENT SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 14-16, 1956	Biloxi, Miss.	F. A. Finney, Jr.	1045 Forrest Ave., Gadsden
Alaska			R. M. MacKenzie	207 Mendenhall Apts., Juneau
Arizona			R. W. Christensen	17 E. Weldon Ave., Phoenix
Arkansas	Apr. 8-11, 1956	Little Rock	D. M. Hamm	Box 89, Clarksville
California	Apr. 23-25, 1956	San Francisco	W. J. Healy	450 Sutter St., San Francisco
S. California			J. P. Bowers	124 W. Lime Ave., Monrovia
Colorado	Oct. 2-5	Colorado Springs	W. R. Humphrey	724 Republic Bldg., Denver
Connecticut	May 9-11, 1956	Hartford	E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			R. V. Reed, Jr.	Medical Arts Bldg., Wilmington
District of Columbia	Mar. 11-14, 1956	Washington	Z. B. Lloyd	2007 R St., N.W., Washington
Florida			W. A. Buhner	167 Broadway, Daytona Beach
Georgia	Oct. 2-5	Atlanta	J. W. Yarbrough	Bibb Bldg., Macon
Hawaii			J. H. Dawe	810 N. Vineyard St., Honolulu
Idaho	Sept. 27-29, 1956	Sun Valley	D. E. Sonius	125 Fourth Ave., N., Twin Falls
Illinois			P. W. Clopper	623 Jefferson Bldg., Peoria
Indiana			D. C. Barnhill	400 Bankers Trust Bldg., Indianapolis
Iowa			H. I. Wilson	639 Insurance Exchange Bldg., Des Moines
Kansas	May 14-17, 1956	Topeka	F. A. Richmond	861 Brotherhood Bldg., Kansas City
Kentucky	Apr. 8-11, 1956	Louisville	A. B. Coxwell, Jr.	1976 Douglass Blvd., Louisville
Louisiana	Apr. 11-14, 1956	Alexandria	J. S. Bernhard	2515 Line Ave., Shreveport
Maine			S. M. Gower	Box 27, Skowhegan
Maryland			C. L. Inman, Jr.	Medical Arts Bldg., Baltimore
Massachusetts			H. E. Tingley	12 Bay State Rd., Boston
Michigan	Apr. 16-19, 1956	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Apr. 23-25, 1956	St. Paul	C. V. E. Cassel	225 Hamm Bldg., St. Paul
Mississippi	June 10-13, 1956	Biloxi	B. A. Cohen	306 Plaza Bldg., Jackson
Missouri	May 6-9, 1956	Jefferson City	E. D. Suggett	201 Merchants Bank Bldg., Jefferson City
Montana	May 3-6, 1956	Helena	E. G. Vedova	Box 311, Roundup
Nebraska	Apr. 30-May 3, 1956	Omaha	F. A. Pierson	1112 Federal Securities Bldg., Lincoln
Nevada			O. M. Seifert	506 Humboldt St., Reno
New Hampshire			F. E. Williams	814 Elm St., Manchester
New Jersey	Apr. 23-25, 1956	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico			J. S. Eilar	Medical Arts Square, Albuquerque
New York	May 14-16, 1956	Syracuse	C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina			R. D. Coffey	Kibler Bldg., Morganton
North Dakota	May 6-9, 1956	Minot	J.H. Pfister	419½ Dakota Ave., Wahpeton
Ohio	Nov. 13-16	Cleveland	E. G. Jones	185 E. State St., Columbus
Oklahoma	Apr. 22-25, 1956	Oklahoma City	S. A. Russman	809 Medical Arts Bldg., Oklahoma City
Oregon	Mar. 5-7, 1956	Portland	T. D. Holder	308 Selling Bldg., Portland
Panama Canal Zone			A. G. Jennings	Box 583, Fort Kobbe
Pennsylvania			M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico			M. A. Rosso	409 Parque St., San Juan

State	Date	Place	Secretary	Address
Rhode Island	Jan. 17, 18, 1956	Providence	W. D. MacIntosh	506 Industrial Bank Bldg., Providence
South Carolina			J. R. Owings	7 Medical Court, Greenville
South Dakota			L. N. Thelen	229 S. Prairie St., Sioux Falls
Tennessee	Apr. 30-May 3, 1956	Memphis	A. M. Ballentine	Pulaski
Texas	Apr. 29-May 2, 1956	Fort Worth	W. Ogle	3607 Gaston Ave., Dallas
Utah	May 17-19, 1956	Salt Lake City	R. C. Dalgleish	124 State Capitol Bldg., Salt Lake City
Vermont			W. J. Reardon	18 Madison St., Rutland
Virginia	May 9-12, 1956	Roanoke	W. T. McAfee	705 Colonial National Bank Bldg., Roanoke
Washington			W. B. Martin	Medical-Dental Bldg., Seattle
West Virginia	July 24-27	White Sulphur Springs	G. N. Casto, Jr.	710½ Lee St., Charleston
Wisconsin	Apr. 9-11, 1956	Milwaukee	A. E. Kopp	Wells Bldg., Milwaukee
Wyoming			T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama			W. L. McCarty	200 Professional Center, Montgomery
Alaska			R. H. Williams	Box 2122, Juneau
Arizona			R. K. Trueblood	107 East A Ave., Glendale
Arkansas			H. O. Weatherly	205 Halter Bldg., Conway
California	July 25	San Francisco	T. E. Tilden	Medico-Dental Bldg., Sacramento
Colorado			J. M. Peabody	724 Republic Bldg., Denver
Connecticut			C. G. Brooks	302 State St., New London
Delaware			P. K. Musselman	143 W. Main St., Newark
District of Columbia			W. T. Birthright	Suite 718, 1835 Eye St., N.W., Washington
Florida	July 11-21*†	Jacksonville	A. W. Keilner	P. O. Box 155, Hollywood
Georgia			P. M. McNeil	307 First National Bank Bldg., Rome
Hawaii	Sept. 1, 2, 4, 5*†‡		H. L. Houvener	427 Dillingham Bldg., Honolulu
Idaho			R. E. Blickenstaff	1023 Fourth St., S., Nampa
Illinois			W. A. McKee	503 Wood Bldg., Benton
Indiana			C. A. Frech	Gary National Bank Bldg., Gary
Iowa			D. J. FitzGerald	615 Brick & Tile Bldg., Mason City
Kansas			G. L. Teall	Box 71, Hiawatha
Kentucky			R. M. Justice	1330 Central Ave., Ashland
Louisiana			R. C. Steib	833 Maison Blanche Bldg., New Orleans
Maine			R. A. Derbyshire	Box 387, Skowhegan
Maryland			H. Levin	3429 Park Heights Ave., Baltimore
Massachusetts			G. J. Fink	Rm. 33, State House, Boston
Michigan			J. L. Champagne	3714 W. McNichols Rd., Detroit
Minnesota			M. G. Walls	615 Montcalm Place, St. Paul
Mississippi			J. C. Boswell	508 Lamar Life Bldg., Jackson
Missouri			R. R. Rhoades	414 Central Trust Bldg., Jefferson City
Montana	July 11-14*†	Helena	V. J. Quinn	301 Phoenix Bldg., Butte
Nebraska			H. E. Weber	1210 Federal Securities Bldg., Lincoln
Nevada			R. Whitehead	Suite 6, Masonic Temple, Reno
New Hampshire			S. G. Markos	8 Renaud Ave., Dover
New Jersey			W. A. Wilson	150 E. State St., Trenton
New Mexico			J. J. Clarke, Sr.	Artesia
New York			D. W. Beier	23 S. Pearl St., Albany
North Carolina			F. O. Alford	1107 Liberty Life Bldg., Charlotte
North Dakota			A. L. Pushor	Lisbon
Ohio			H. B. Smith	322 E. State St., Columbus
Oklahoma			R. P. Keidel	403 Surety Bldg., Muskogee
Oregon			F. L. Utter	506 Pioneer Trust Bldg., Salem

State	Date	Place	Secretary	Address
Pennsylvania			A. M. Stinson	Dept. of Public Instruction, Box 911, Harrisburg
Puerto Rico			J. Mercado C.	Box 3717, Santurce
Rhode Island			F. M. Hackett	267 Academy Ave., Providence
South Carolina			T. C. Sparks	1315 Pickens St., Columbia
South Dakota			H. T. Aker	Canton
Tennessee			C. R. Aita	619 Bennie Dillon Bldg., Nashville
Texas			R. T. Weber	312 Capital National Bank Bldg., Austin
Utah			D. L. Folsom	1101 First Security Bank Bldg., Salt Lake City
Vermont			P. M. Fitch	Newport
Virginia			J. M. Hughes	715 Medical Arts Bldg., Richmond
Washington			M. L. Mower	National Bank of Commerce Bldg., Olympia
West Virginia			C. A. Laughlin	613 Prunty Bldg., Clarksburg
Wisconsin			S. F. Donovan	Tomah
Wyoming			W. A. Hocker	210 O & S Bldg., Casper

Most states require applications to be in 30 days prior to examination date.
*Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations. §Approximate dates—verify with state dental examining board.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
American Academy of Dental Medicine	Dec. 4	New York	W. M. Greenhut Secy.	124 E. 84th St., New York
American Academy of Pedodontics	Oct. 12-14	San Francisco	E. C. Schildwaohter Secy.	6831 Seville Ave., Huntington Park, Calif.
American Association of Dental Examiners	Oct. 14, 15	San Francisco	C. A. Bumstead Secy.	924 Stuart Bldg., Lincoln, Neb.
American Association of Public Health Dentists	Oct. 16	San Francisco	R. D. Smiley Secy.	Indiana State Board of Health, Indianapolis
American Board of Dental Public Health	Oct. 13, 14	San Francisco	P. E. Blackerby, Jr. Secy.	250 Champion St., Battle Creek, Mich.
American Board of Oral Pathology	Dec. 11	Washington, D.C.	D. A. Kerr Secy.	School of Dentistry, University of Michigan, Ann Arbor, Mich.
American College of Dentists	Oct. 16	San Francisco	O. W. Brandhorst Secy.	4221 Lindell Blvd., St. Louis
American Dental Assistants Association	Oct. 17-20	San Francisco	M. L. Martin Exec. Secy.	410 First National Bank Bldg., La Porte, Ind.
American Dental Assistants Certification Board, Inc.	Oct. 16-20	San Francisco	A. Carey Secy.	601 National Bank Bldg. Lima, Ohio
American Dental Society of Anesthesiology	Oct. 16, 17	San Francisco	J. H. Mervis Secy.	510 Walnut St., Clairton, Pa.
American Dental Society of Europe	July 11-14	Amsterdam, Netherlands	J. Moloney Hon. Secy.	110 Harley St., London, England
American Denture Society	Oct. 14, 15	San Francisco	A. L. Roberts Secy.	Aurora Main Bldg., Aurora, Ill.
American Institute of Dental Medicine	Oct. 23-27	Palm Springs, Calif.	M. G. Lewis Exec. Secy.	2240 Channing Way, Berkeley, Calif.
American Public Health Association	Nov. 14-18	Kansas City Mo.	R. M. Atwater Exec. Secy.	1790 Broadway, New York
American Society of Oral Surgeons	Oct. 11-14	Los Angeles	R. F. Whalen Exec. Secy.	M. C. V. Post Office, Box 876, Richmond, Va.
Ark-La-Tex Dental Congress	Aug. 15	Shreveport, La.	K. V. Donaldson Gen. Chm.	1470 Albert St., Alexandria, La.
Austrian Dental Meeting	Sept. 1-4	Linz on the Danube, Austria	Prof. Hofer Secy.	Medical Association of Upper Austria, Dinghoferstrasse 4, Linz on the Danube, Austria
British Dental Association	July 4-8	Glasgow, Scotland	H. P. Buchanan Secy.	13 Hill St., Berkeley Square, London, England
Chicago Dental Society	Feb. 5-8, 1956	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago

Name	Date	Place	Secy. or Chm.	Address
Council on Dental Education, Dental Aptitude Tests	Oct. 7, 8		S. Peterson Secy.	222 E. Superior St., Chicago
Eighth New Orleans Dental Conference	Oct. 30-Nov. 2	New Orleans	B. G. Frick, Jr. Secy.	930 Canal St., New Orleans
Federation Dentaire Internationale	Aug. 14-20	Copenhagen, Denmark	G. H. Leatherman Secy. Gen.	35 Devonshire Place, London, England
Fourteenth Congres Francais de Stomatologie	Oct. 3-9	Paris, France	R. Vrasse Secy. Gen.	2, Rue de Miromesnil, Paris, France
German Association of Maxillo-Facial Surgery	July 27-30	Hamburg, Germany	F. Schön Secy.	Ludwigstrasse 30, Bad Reichenhall/Bayern, Germany
Greater New York Dental Meeting	Dec. 5-9	New York	M. Purdy Exec. Secy.	Rm. 106A, Hotel Statler, New York
Mexican Dental Association, Third Dental Congress	Oct. 23-28	Mexico City	G. Sanchez C.	Uruapan 3, Mexico, D. F.
Mid-Continent Dental Congress	Nov. 27-30	St. Louis	J. E. Brophy Exec. Secy.	8013 Maryland Ave., St. Louis
National Board of Dental Examiners	Dec. 5, 6		G. J. Casey Secy.	222 E. Superior St., Chicago
National Dental Association	Aug. 1-5	Chicago	J. A. Jackson Secy.	P. O. Box 197, Charlottesville, Va.
New England Dental Society	Nov. 2, 3	Boston	F. L. Finley, Jr. Secy.	43 Farmington Ave., Hartford, Conn.
New Orleans Dental Conference	Oct. 30-Nov. 2	New Orleans	W. O. Goggin Chm.	Maison Blanche Bldg., New Orleans
Pacific Coast Society of Prosthodontists	Oct. 14, 15	San Francisco	A. W. Spaulding Secy.	4350 11th Ave., Los Angeles
Second Panhellenic Congress	Sept. 25-30	Athens, Greece	B. Stefanopoulos-Vrettos	71 Skoufa St., Athens, Greece
Southern Society of Orthodontists	Sept. 25-28	Charlotte, N. C.	M. D. Edwards Secy.	132 Adams Ave., Montgomery, Ala.
Southwestern Society of Orthodontists	Oct. 16-19	Wichita, Kansas	H. S. Born Secy.	908 Johnstone, Bartlesville, Okla.

INDEX TO ADVERTISEMENTS

July 1955

Abbott Laboratories A-25
American Dental Association
A.D.A. Specifications for Dental Materials A-7
Annual Session ..... 2nd Cover
1956 Appointment Book A-23
Dental Abstracts A-13
Hotel Reservation Application .. A-18, A-19
American Ferment Co., Inc. A-32
Amurol Products Co. A-49, A-51
Ash, Sons & Co., Claudius A-37
Astra Pharmaceutical Products, Inc. ..... A-22, Insert
Austenal Laboratories, Inc. A-4, A-5

Baker & Co., Inc. A-11
Bristol-Myers Co. ..... 3rd Cover

Caulk Co., L. D. A-6, A-26
Church & Dwight Co., Inc. A-27
Classified Advertising A-20, A-21, A-22
Coe Laboratories, Inc. A-12
Columbia Dentoform Corp. A-52
Columbus Dental Mfg. Co. A-24
Colwell Publishing Co. A-40
Condit, P. N. A-10
Cook-Waite Laboratories, Inc. A-42, A-43
Crescent Dental Mfg. Co. A-53

Dental Perfection Co. A-45
Dentists' Supply Co., of New York, The ..... 4th Cover

Exakta Camera Co. A-52

Gesner, Inc., M. A. A-31
Gomco Surgical Mfg. Corp. A-14
Great-West Life Assurance Co. A-48

Hamilton Manufacturing Co. A-29
Hudson Products A-10

International Nickel Co., Inc., The A-41
Invincible Metal Furniture Co. A-40

Jelenko & Co., J. F. A-1
Johnson & Johnson A-16
Justi & Son, Inc., H. D. A-40

Kerr Manufacturing Co. A-36
Kling Photo Corp. A-22

Lauer Metal Shop A-22
Lederle Laboratories A-3

Moyer Co., Inc., The J. Bird A-38

Ney Co., The J. M. A-28

Odontographic Mfg. Co. A-15

Pan-Pacific Dental Conference A-49
Pelton & Crane Co. A-39
Pfingst & Co., Inc. A-2
Physicians Casualty & Health Assn. A-51

Rinn X-Ray Products, Inc. A-44
Ritter Co., Inc. A-33
Rower Dental Mfg. Co. A-52

Saunders Co., W. B. A-34
Squibb & Sons, E. R., Division of Mathieson Chemical Corp. A-50
Surgident, Ltd. A-23

Ticonium A-30, A-35

Wernet Dental Mfg. Co., Inc. A-46, A-47
White Dental Mfg. Co., The S. S. A-8, A-9
Wyeth Laboratories A-54

Hotel reservation application

96th Annual Session
American Dental
Association
Oct. 17-20, 1955
San Francisco

INSTRUCTIONS: Reservations for hotel accommodations may be secured for San Francisco by completing this application and mailing it to: A.D.A. Housing Bureau, 61 Grove Street, San Francisco 2.

Be sure to indicate your arrival time in San Francisco. Reservations will be held only until 6 p.m. of the day you indicate when you will arrive in San Francisco unless special arrangements are made with the hotel.

Names of all persons who intend to occupy the accommodations must be listed on the application.

List four choices of hotels. Confirmation will be sent to the applicant indicating which hotel has accepted the reservation.

Write the A.D.A. Housing Bureau in San Francisco if you wish to cancel the reservation.

A.D.A. HOUSING BUREAU • 61 GROVE STREET, SAN FRANCISCO 2

(Please print or type) A.D.A.

Applicant:

Name _____

_____
(Street address) (City) (Zone) (State)

Arrival in San Francisco _____ a.m. p.m. Leaving _____

Accommodations:

Hotel _____ (First choice) Hotel _____ (Third choice)

Hotel _____ (Second choice) Hotel _____ (Fourth choice)

☐ Single occupancy, rate to range from $_____ to $_____ per day.
☐ Double occupancy, double bed, rate to range from $_____ to $_____ per day. } 2 names must be listed below
☐ Double occupancy, twin beds, rate to range from $_____ to $_____ per day. }
☐ Suite of _____ rooms, including parlor, rate to range from $_____ to $_____ per day.

Occupants: (use an extra page for listing additional names if necessary)
Room will be occupied by:

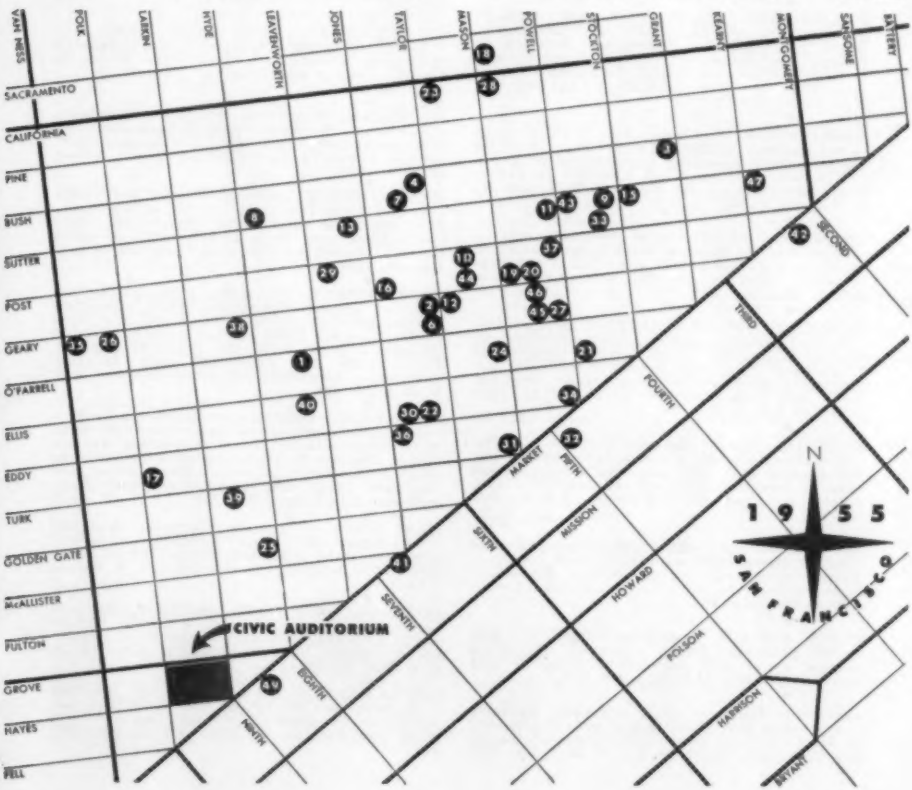
_____
(Name) (Address) (City) (State)

_____
(Name) (Address) (City) (State)

HOTELS IN SAN FRANCISCO

KEY NO.	HOTEL	SINGLE	DOUBLE
1	Alexander Hamilton	$6.50–10.50	$ 9.00–13.50
2	Bellevue		8.00–11.00
3	Beverly Plaza	6.00– 7.00	8.50– 9.00
4	Biltmore	5.00– 6.00	6.00– 8.00
6	Californian		8.00–10.00
7	Canterbury		6.00–10.00
8	Carlton		5.50– 6.00
9	Cartwright		6.00– 7.00
10	Cecil	4.00– 6.00	5.00– 8.00
11	Chancellor	5.50	7.50– 8.50
12	Clift	8.00–14.00	10.00–20.00
13	Commodore	4.00– 7.00	6.00–10.00
15	Drake Wiltshire	7.00– 8.00	7.50–10.00
16	El Cortez	5.00– 7.00	6.00–10.00
17	Embassy	4.00– 5.00	4.00– 7.00
18	Fairmont	10.50–16.00	13.50–19.00
19	Fielding	4.00– 7.00	5.00– 9.00
20	Franciscan	3.50– 5.00	5.00– 9.00
21	Golden State		5.00– 8.00
22	Herald		4.00– 6.00
23	Huntington	8.00–12.50	8.00–15.00
24	King George	4.00– 5.00	5.00– 8.00
25	LaSalle	5.00	6.00– 7.00

KEY NO.	HOTEL	SINGLE	DOUBLE
26	Lombard	$ 4.00– 6.00	$ 5.00– 9.00
27	Manx	5.50– 7.00	7.50– 9.50
28	Mark Hopkins	10.00–14.00	14.00–20.00
29	Maurice	5.00– 6.00	6.50– 8.00
30	Olympic		6.00–10.00
31	Oxford		6.00– 6.50
32	Pickwick	4.50– 5.50	6.00– 8.00
33	Plaza		7.00–10.00
34	Powell	3.50– 4.25	4.25– 6.50
35	Richelieu	4.00– 6.00	5.00– 9.00
36	Roosevelt	3.50– 5.00	4.50– 7.00
37	St. Francis	8.00–18.00	10.00–20.00
38	San Carlos		3.50– 5.00
39	Senate	4.00	5.00– 6.00
40	Senator	3.50– 3.75	4.00– 5.00
41	Shaw	4.00– 5.00	5.00– 6.50
42	Sheraton-Palace	8.00–13.00	10.00–17.00
43	Sir Francis Drake	8.50–14.50	10.50–19.50
44	Somerton	3.00– 4.00	4.00– 7.00
45	Spaulding	4.00	5.00– 6.00
46	Stewart	4.50– 7.00	6.00–12.00
47	Sutter	4.00– 5.50	6.00– 9.00
49	Whitcomb	5.00– 9.00	7.00–12.00



CLASSIFIED ADVERTISING

Forms close on 25th of second month preceding month of issue

Remittance Must Accompany Classified Ads.

Classified advertising rates are as follows:
30 words or less—per insertion.....$4.00
Additional words, each.....,10
Answers sent c/o American Dental Association.....no extra charge
Replies to A.D.A. box number ads should be addressed as follows:
American Dental Association
222 E. Superior Street
Chicago 11, Ill. Box.....
Please be sure that the box number appears on the envelope.

PRACTICES AND OFFICES FOR SALE AND RENT

CALIFORNIA — For rent, completely equipped, two-chair, bungalow dental office, approximately 1,000 sq. ft., in heart of professional district. Parking space. Well established general practice. Dentist in service until April 1957. Contact Mrs. Frank H. Saito, 506 Estudillo Ave., San Leandro, Calif.

●

CALIFORNIA—Fontana, Kaiser steel town. For rent, bungalow dental office, completely equipped, furnished, two operatories, x-ray, reception, recovery, consultation, dark room, business office, laboratory. Established seven years. Across from U.S. Post Office. Called into service. Dr. Joseph Berenbaum, 8627 Wheeler, Fontana, Calif.

●

CALIFORNIA—Practice for sale, beautifully equipped two-chair, air-conditioned office in Sacramento. Excellent location in prosperous community, near hospital and schools. Latest equipment. Established practice. Will sacrifice. Address P. O. Box 268, Fair Oaks, Calif.

●

CALIFORNIA—For lease, dental office space in medical building with M.D. Former dentist, with excellent established practice, called into service. Good location in growing community. J. W. Kramer, M.D., 108 W. 8, Corona, Calif.

●

CONNECTICUT—For sale. Central location New Haven. Modern, well equipped office, with or without active practice. Very reasonable. Good reason for selling. Address A.D.A. Box No. 978.

●

DISTRICT OF COLUMBIA—Retiring. For sale. Lucrative cash dental practice, no books. Will stay to introduce. Located in downtown shopping area. Wonderful opportunity for mature progressive dentist. Cash and terms can be arranged to suit. Address A.D.A. Box No. 917.

●

FLORIDA—Miami Beach. For sale, completely equipped, modern, two-chair office. Air-conditioned elevator building. Finest central location, main street, Lincoln Road. Available June 1956. Address A.D.A. Box No. 971.

●

INDIANA—South Bend. For sale, dental office, completely equipped. Good location. Terms convenient to purchaser. Excellent opportunity. Available immediately. Address A.D.A. Box No. 986.

●

IOWA—For sale, two-chair bungalow office and practice. Fully equipped operating rooms, x-ray and laboratory. County seat town. Address A.D.A. Box No. 975.

●

KANSAS—For sale, fully equipped, modern, two-chair dental office and practice in city of Wichita. Over $50,000 gross in 1954. Leaving the state. Address A.D.A. Box No. 972.

MARYLAND—(D.C. line) Silver Spring. For sale or rent, attractive, air-conditioned, well equipped Ritter one (or two) chair, five-room garden apartment (400-unit) office. Established 1953. Reasonably priced. Entering service. Address A.D.A. Box No. 970.

●

MARYLAND—For sale, well established general practice in Montgomery county. Only dentist in rapidly expanding town. Spacious two-chair office, large laboratory, dark room, private bath and two large reception rooms. Fine paneling throughout. Write P. O. Box 171, Kensington, Md.

●

MASSACHUSETTS — For sale. Fully equipped dental practice, three rooms, plus laboratory and dark room. Retiring after 36 years, ill health. Twelve miles from Boston. Best office building in community. Rent reasonable. Address A.D.A. Box No. 973.

●

MICHIGAN—For sale. Busy, well-established general practice, southwestern Michigan. Modern two-chair office. Grossing $20,000. Owner specializing. Address A.D.A. Box No. 966.

●

MICHIGAN—Southwest on Lake Michigan. For sale, established practice and complete equipment two-chair office. Rent reasonable. Owner plans to specialize. Address A.D.A. Box No. 968.

●

NEW JERSEY—Asbury Park. For sale. Home with two-chair dental office, owner's six-room and bath apartment, also three-room and bath apartment for extra income. Excellent location. Address A.D.A. Box No. 931.

●

NEW JERSEY—For sale. Fine old established general practice. Two operating rooms, total 11 rooms. Provisions for third chair and unit. Rent $70 per month. Located Bergen county with its unusual growth. $7,000 cash for immediate sale. Moving. Telephone Allendale 1-3220 or address A.D.A. Box No. 988.

●

NEW YORK—For sale, practice and office, established 20 years, same location midtown Manhattan. Two operating rooms, Ritter equipped. Attractive foyer, business office and reception room. Many other advantages. Will negotiate five year lease. Address A.D.A. Box No. 984.

●

NEW YORK—For sale. Upstate, equipped five-room suite, ultramodern, excellent clientele. Will consider terms. Write A. H. Boss, 2215 Nott St., Schenectady, N. Y. Phone 4-4013.

●

OHIO—For sale, fully equipped, modern, spacious, one-chair office with second chair. Located in shopping center in beautiful suburban lake community. Address A.D.A. Box No. 974.

●

OHIO—For sale. Fine orthodontic practice in northeastern Ohio city. Excellent opportunity for edgewise-trained man. All replies confidential. Address A.D.A. Box No. 991.

PENNSYLVANIA—For sale. Dental office, fully equipped, combined with modern home, central, near Harrisburg. Former dentist deceased. Replacement urgently needed. Terms. Or will rent offices (4 rooms). Reasonable. Ready to begin practice. Mrs. Fay Mullen, 200 W. Main St., Mechanicsburg, Pa.

●

PENNSYLVANIA—Dental office for sale. Going into orthodontics. Two-chair office, Ritter fully equipped. Small college town in eastern Pa., between Allentown and Reading. Apartment accompanies office. Address A.D.A. Box No. 949.

●

WISCONSIN—For sale. Extensive 53 year practice and good will of the late Dr. Anton Vold in west central Wisconsin. Contact Mrs. Anton Vold, Box N, Whitehall, Wis.

●

WISCONSIN—For sale, three or four-chair established practice in Madison, university city. New medical building, west side. Complete, ready to step into. Low down-payment and easy terms to suit. Lease. If desired, will remove some equipment. Dr. J. J. Coyne, Medical Arts Bldg., 3414 Monroe St., Madison, Wis.

LOCATIONS AVAILABLE

FLORIDA—Opportunity. Space available for Florida licensed dentist. Modern office building occupied by busy general practitioner (M.D.). Ample off-street parking. Established location. Prosperous community. Busy practice assured from start. For details call collect or write Allen Shepard, M.D., 638 United St., Key West, Fla.

●

NEW YORK—Opportunity oral surgeon in well-located medical building. Unopposed. Offices to specifications. Reasonable rental. Occupancy September 1955. Dr. David Lang, 101 Hillside Ave., Williston Park, L. I., N.Y. Phone Pioneer 2-3644.

●

SOUTH CAROLINA—Four modern treating rooms in lovely new two-story brick home. Town without dentist. Property built for own use. Bargain. Will sell. Easy terms to reliable dentist. Write Dr. W. Gano Compere, Blacksburg, S. C.

●

TENNESSEE—Five-room modern offices, living quarters above, on three lane highway, three miles from Johnson City, three from Elizabethton. Will sell or lease very reasonably. Built for own use. Write Dr. W. Gano Compere, Blacksburg, S. C.

●

TEXAS—Suburban location to establish dental practice in growing community in one of southwest's most rapidly growing cities. Eight M.D.'s in immediate vicinity, unlimited parking facilities, private reception room, natural light, reasonable lease on 1,000 sq. ft. Address Mrs. Oma Lee Burt, 2710 W. 10 St., Amarillo, Texas.

OPPORTUNITIES AVAILABLE

Dentists

CALIFORNIA—Youth Authority Reception Center near Los Angeles has opening for dentist with California license. Close to all southern California recreation areas. Three weeks' paid vacation, 11 holidays, excellent retirement system, liberal sick leave benefits. Pleasant working conditions in modern up-to-date clinic. Contact H. R. Brickman, M.D., Director of Clinical Services, Southern Reception Center and Clinic, Norwalk, Calif.

CALIFORNIA—Wanted, recent graduate for new medical-dental center. Drs. Brand and Suffin, 21418 S. Norwalk Blvd., Hawaiian Gardens, Artesia, Calif. Phone Torrey 5-5296.

●

DISTRICT OF COLUMBIA—Draft exempt, dependable, ambitious associate. Percentage with minimum drawing $100 per week. Opportunity for right man to take over practice. Address A.D.A. Box No. 917.

●

KANSAS—There is a good opening for a dentist here at Sabetha, Kan. Write J. George Kerr, 1424 W. Oregon St., Sabetha, Kan.

●

NEW YORK—Entering service. Wonderful immediate opportunity for general practitioner in modern, thriving, three-chair office. Practice 18 years old. Dr. Edward Cohen, 2675 E. Fayette St., Syracuse, N. Y. Phone 72-5402.

●

NORTH DAKOTA—Growing county seat town, with a population of 1,300 in east central North Dakota, wants a dentist. Our only dentist has transferred. Wonderful opportunity. Address A.D.A. Box No. 887.

●

NORTH DAKOTA—Unparalleled opportunity for dentist, graduate approved school, to become associated as a partner with three man modern medical clinic. Guaranteed salary at least $600 plus per month start. Facilities consist of suite of offices in clinic building, also immediate hospital privileges. Hospital accredited by American Hospital Association and American College of Surgeons. Clinic headed by diplomate of the American Board of Surgery. May begin practice in July, after taking State Boards. Write immediately to Dr. Martin Hochhauser, Garrison Clinic, Garrison, N. D.

●

OHIO—Positions for dentists available in Cincinnati school dental clinics. Salary $2.50 to $3.50 maximum per hour. Vacation, sick leave and retirement benefits. Forty hours a week. Contact Dr. E. Horace Jones, 608 E. McMillan St., Cincinnati 6, Ohio.

●

OKLAHOMA—Young dentist to share office. Percentage or partnership can be arranged. Modern office, 10 rooms, in the heart of large medical-dental center in large city in Oklahoma. Prefer service exempt person. Address A.D.A. Box No. 954.

●

PENNSYLVANIA—(Eastern area). Large industry desires Pennsylvania licensed, draft-exempt dentist for two years only. Industrial dental health experience and knowledge essential. Exceptional training and experience in radiology, exodontics and general practice required. State training and experience. Address A.D.A. Box No. 891.

●

TEXAS—Partnership available in general dental practice, including full equipment of three-chair, downtown, air-conditioned offices. Individual currently averaging $1,000 weekly. Address A.D.A. Box No. 985.

Hygienists

INDIANA—Wanted hygienist, northern Indiana. Salary $125 to $160 per week. Address A.D.A. Box No. 902.

●

INDIANA—Fort Wayne. Wanted hygienist. X-ray and prophylaxis only. Modern S. S. White operating room. Established hygiene practice. Excellent salary, plus commission. Address A.D.A. Box No. 983.

●

LOUISIANA—Hygienist wanted, southwest Louisiana. X-ray and prophylaxis only. Private operating room. New dental clinic. Established clientele. Excellent salary. Address A.D.A. Box No. 989.

OPPORTUNITIES WANTED

Dentists

D.M.D., Harvard, Florida license, 15 years' general practice, desires location with physician, orthodontist or oculist in West Palm Beach area. Address A.D.A. Box No. 963.

•

Virginia and District of Columbia licensed dentist, partly retired, desires an industrial dental clinic, hospital residency or a small rural practice. Address A.D.A. Box No. 987.

•

Dentist, recently discharged from Air Force, desires association with general practitioner in Chicago area. Has 10 years' experience in private practice and Air Force. Married. Resides in Chicago area. Address A.D.A. Box No. 982.

•

Experienced general practitioner, age 31, Ohio and West Virginia licensed. Desires association with dental-medical group or busy practitioner in a larger city. Prefer Cleveland, Ohio, or Beckley or Bluefield, W. Va. Military obligation completed. Address A.D.A. Box No. 977.

•

New England states and Maryland licensed, oral surgery experience. Being discharged from service. Desires association or practice. Address A.D.A. Box No. 990.

■

Licensed in Indiana and Pennsylvania, qualified in oral surgery and exodontics, D.D.S. desires to purchase or to associate with established practice. Military service completed recently. Address A.D.A. Box No. 980.

Dentist, Illinois license, interested in association or purchase of practice in Chicago or northern Illinois. Will complete tour in Air Force about July 1955. Address A.D.A. Box No. 940.

•

New Jersey licensed dentist, 42, highly experienced in all phases, desires location or association. Able to offer the best of references. Willing to make small initial investment for solid opportunity. Address A.D.A. Box No. 976.

WANTED TO BUY

Old or used dental books, journals, prints. Leo L. Bruder, 1 DeKalb Ave., Dept. 21, Brooklyn, N. Y. Dealer in out-of-print dental literature.

FOR SALE

Temporomandibular joints apparatus. Complete Lindblom focusing apparatus, plus technic for taking temporomandibular joint roentgenograms. New, perfect condition. Chair positioner included. Dr. N. A. Shore, 551 Fifth Ave., New York, N. Y.

•

Weber Imperial model H Unit motor chair, model 6A x-ray, Allison cabinet, American Steriliser, Prometheus light, waste receptacle, forceps, surgical and operating instruments, laboratory equipment. Purchased new 1951. Reason for sale, remaining in service. Mississippi. Address A.D.A. Box No. 979.

SOLID BRONZE NAME SIGNS

Cast, raised letters, drilled, with screws

3" x 12" — $12.60	3" x 14" — $14.70	3" x 16" — $16.80
4" x 14" — $19.60	4" x 16" — $22.40	4" x 18" — $25.20
5" x 16" — $28.00	5" x 18" — $31.50	5" x 20" — $35.00
6" x 18" — $37.80	6" x 20" — $42.00	6" x 25" — $52.50

Other sizes 35c per sq. in. Minimum, $7.00. Signs with wording on both sides 60c per sq. in.
COLLECT PLEASE SEND CHECK WITH ORDER

LAUER METAL SHOP • 1516 E. Baltimore Street • Baltimore 31, Md.

for your WORK, for your PLEASURE
you need the world's tiniest precision camera
—the fabulous minox

so tiny (1⅛" x 3¼" x ⅝"), you always carry it.
so light (2½ oz.), less than your keys.

perfect candid pictures in black and white... and color. fast f/3.5 lens focuses as close as 8" and up to inf. all speeds from ½ sec. up to 1/1000 sec. *NO FLASH NECESSARY FOR INSIDE SHOTS. USE IN OPERATING ROOM and for CASE HISTORIES.* yields excellent large size prints.

minox III-S with chain and leather case $139.50

for literature and your dealer's name, write Dept. E
KLING PHOTO CORP., 235 FOURTH AVENUE, NEW YORK 3, NEW YORK

When performance counts...

Council Acceptance is your assurance of high professional standards.

Professional samples and descriptive literature available on request

ASTRA PHARMACEUTICAL PRODUCTS, INC.

7½ Neponset Street Worcester, Mass., U. S. A.

tops as a topical..

WIDE MOUTH JAR
For office use in all phases of operative dentistry

Accepted American Dental Association

Council Acceptance is your assurance of high professional standards.

PROFESSIONAL DISPENSETS
For dentist-directed home use

- *Especially under new dentures*

Professional samples and descriptive literature available on request

ASTRA PHARMACEUTICAL PRODUCTS, INC.
7½ Neponset Street Worcester, Mass., U.S.A.

NOW IS THE TIME

to order your

ADA Appointment Book for 1956

avoid delay or disappointment

Take full advantage of the patient recall feature

$2.00 per copy

Order Department, AMERICAN DENTAL ASSOCIATION
222 East Superior Street, Chicago 11, Illinois

Please enter my order for_____copies of (Catalogue No. M-2) A.D.A. Appointment Book for 1956 at $2.00 per copy. My remittance of $_____ is enclosed.

name _____

address _____

city, zone, state _____

please type or print

How to order A PERFECT IMPRESSION EVERY TIME • •

Say Surgident and be sure!

Surgident IMPRESSION MATERIAL

The pioneer reversible hydrocolloid that gives you a perfect impression every time. Molded in five convenient sizes for the various applications to restorative dentistry. Surgident Impression Material is the ultimate in accuracy for every impression from full mouth to the smallest inlay.

Surgident NEO-PLEX

The new improved rubber base material especially designed for inlays, crowns, bridges, splints, jacket crowns and all small type elastic impressions. Truly gives an impression that is dimensionally stable, elastic, permanent, accurate, correctable and tough, with ample working time and no need to pour models immediately.

Your Dental Dealer will supply you.

Surgident, LTD.
West Los Angeles 25, Calif.

FROM WHERE WE SIT, there appears to be a swing toward more *fixed bridges*. It's a good trend. For where mouth conditions permit, there is no restoration that compares with a fixed bridge.

And may we suggest that in fixed bridgework *Trupontic teeth* (anterior or posterior) provide advantages *not* obtained with any other type of tooth. More comfortable . . . More sanitary. Ideally suited to the newer technics; and the only tooth *completely* suited to fixed bridge immediate-extraction cases.

Steele's Trupontics

The Columbus Dental Manufacturing Company • Columbus 6, Ohio

Sugar-restricted *dieting* can be a *pleasure!*

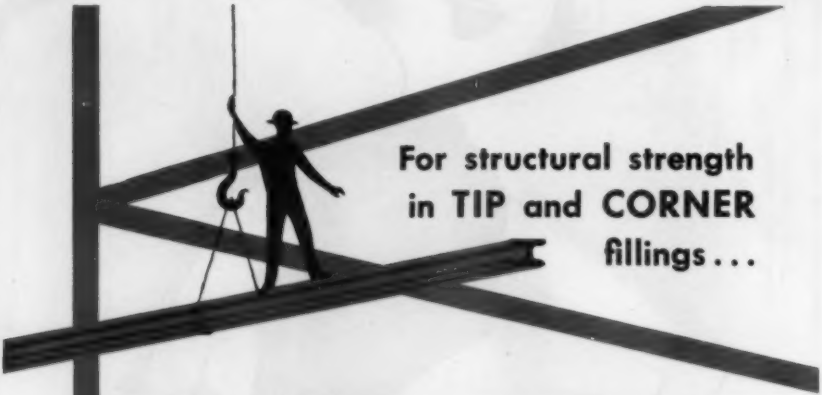
Summer-time diets can be as sweet and tasty as you please —with nary a grain of sugar added. The secret: non-caloric SUCARYL, of course. Pure sweetness and nothing else. At all pharmacies.

Abbott

SUCARYL® new non-caloric sweetener

(CYCLAMATE, ABBOTT)

607375



For structural strength in TIP and CORNER fillings . . .

KADON

Even in large tip and corner restorations, you can use Kadon with confidence!

Regardless of cavity size, you are assured of excellent results when you follow the "rule of 3." *One*: Use Caulk *Cavity Primer* to make dentine and enamel chemically receptive. *Two*: Use the *brush-on technic* to control shrinkage and provide tightest possible adaptation. *Three*: Use *Colorfast Kadon* for permanent esthetic effect. Even under intense ultraviolet rays, no color change is detectable by the unaided eye.

BEFORE

AFTER

P. S. For posterior fillings of lifelike appearance, use **Bycor** where indicated. This resin-silica composition offers ease of manipulation, tight adaptation, quick setting, prompt finishing.

For modern materials call on **Caulk** MILFORD, DELAWARE

Accepted by the American Dental Association as Sodium Bicarbonate U.S.P.

Millions of users...
A. D. A. acceptance...

prove Baking Soda can be recommended with confidence

FREE Children's Booklets—We would like to send you children's booklets for your waiting room. They are approved by leading educators. Just write to us at the address below.

Church & Dwight Co., Inc.

70 Pine Street • **New York 5, N. Y.**

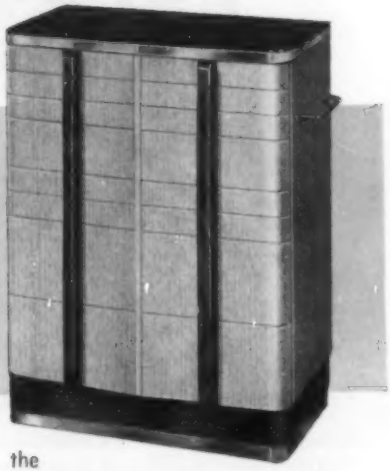
BUSINESS ESTABLISHED IN 1846

Ney's Balanced Line Golds, Ney-Oro A-1 for inlays,
Ney-Oro B-2 for bridges, and Ney-Oro G-3 for partials,
are "inconspicuous where it counts"...in the mouth.
The carefully developed neutral color of these
modern matching golds *blends* in, *reflects* tissue colors,
is far less noticeable than white metal or dark color gold.

THE J. M. NEY COMPANY
HARTFORD 1, CONNECTICUT

If it's efficiency you want most in a cabinet...

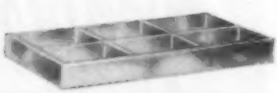
AMERICAN...by Hamilton



Maximum efficiency—inside and out. Typical American mobile cabinet—Model 176. Commodious, but moves easily on rollers—for instant access to 16 drawers, with 24 assorted glass trays (like those shown), 14 bottles in concealed medicine compartment, lead-lined film box, silicate and cement inserts. Raised-rim top of unbreakable, easy-to-clean gray grid Formica.

When you buy an American Cabinet — as the majority of dentists do — you make one of the soundest investments of your career. You acquire modern beauty for your office — convenience to make your work easier — and, above all, numerous features to complement your own skill for neat, swift, efficient dentistry.

Four of the five American models are mobile (permitting seated work) and every model is available in five handsome Colortone finishes. See them soon at your American dealer — or write us for his name.



Hamilton
AMERICAN CABINETS

HAMILTON MANUFACTURING COMPANY
Two Rivers, Wisconsin

Tilon IS CURED UNIDIRECTIONALLY

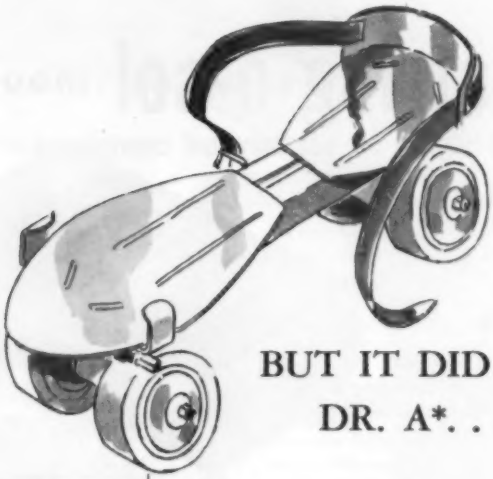
Fits perfectly. This test denture — like every Tilon denture — was dry-cured by modern, electrical, unidirectional curing for a perfect fit — every *time!*

TILON by TICONIUM
413 No. Pearl St., Albany 1, N. Y.

OFFERS BETTER

FIT
COLOR
STRENGTH

"IT COULDN'T HAPPEN TO ME . . ."



BUT IT DID TO DR. A*. . .

The time you spend at the chair is the essence of your professional income.

You know what your operating hours are worth to you.

You can also figure readily your loss of vital income if accident or illness impair or permanently cut off your productive time at the chair.

To protect your earning power in case of serious disability causing extended absence from your practice, apply now for ADA group insurance. You will thus get the additional coverage you need for yourself and your family.

Dr. A* accidentally stepped on a child's toy—fractured the knuckles of his right hand—later accidentally burned the bandage with a cigarette and permanently lost the use of all his fingers. Total payments under ADA insurance expected to be paid are $24,000.00.

Save 35 to 50 per cent of the cost of similar protection individually purchased.

For complete information regarding benefits, regulations and semi-annual rates, communicate with the Trustee of the Policy, Dr. Paul Zillmann, 29 Walden Avenue, Buffalo 11, New York or with M. A. Gesner, Inc., 150 East Superior Street, Chicago 11, Illinois.

Issued Exclusively by

NATIONAL CASUALTY COMPANY of Detroit

Through

M. A. GESNER, INC.

150 East Superior Street **WHitehall 3-1525** **Chicago 11, Ill.**

Since the National Casualty Company's plan of accident and health insurance has been in effect for many years in New York, New Jersey, California, Utah and Nevada, the Association Plan is not available in those states.

Astring-o-sol mouthwash

concentrated for economy and convenience

a little goes a long way

- Here is a peppy, invigorating mouth rinse that not only tastes good and sweetens the breath, but also helps loosen and flush away organic debris.
- Astring-o-sol is an efficient detergent and effective deodorant. It will not injure delicate oral tissues and is ideal for daily mouth care.
- It's economical . . . it takes only a few drops of concentrated Astring-o-sol in a half-glass of water for a pleasing and effective mouthwash.
- USE IT AT THE CHAIR BEFORE AND AFTER DENTAL PROCEDURES
- RECOMMEND IT TO YOUR PATIENTS FOR DAILY MOUTH CARE

Remember... it takes only drops instead of drams because it's concentrated.

American Ferment Co., Inc.
1450 Broadway, New York 18, N. Y.

Ritter Equipment Gives You More...

INSTRU-MATIC UNIT
AND
CENTURY MOTOR CHAIR

operating ease

a touch of the switch and instruments float quietly from concealed to operating position. Century Chair's automatically compensating backrest allows easier positioning of your patient.

efficiency

exclusive Ritter automatic water supply fills cup—shuts off—refills after patient use. A touch of your toe brings the Century Chair to the exact height you want.

flexibility

new low position of chair is ideal for work on lower jaw, particularly extractions. New, powerful engine, built into Instru-Matic unit, assures wider range of speeds, use of modern high-speed techniques.

prestige

patients will be quick to recognize the modern appearance and beauty of your equipment, secure in the knowledge that the equipment fully complements your skills.

patient comfort

patient time in the Ritter Century Chair will be more relaxed and comfortable . . . thanks to contour molded foam rubber cushions, "lounge chair" armrests, and the new, universal foot platform.

See your Ritter dealer now, or write the Ritter Company, Inc., 107 Ritter Park, Rochester 3, New York.

Ritter Company Inc.

New (4th) Edition!

Oral and Dental Diagnosis

By Thoma & Robinson

A complete and up-to-date guide to aid you in meeting your every problem in oral diagnosis. The authors present for *each dental disorder* a clinically complete diagnostic description, with technics of history taking, physical examination and laboratory tests. Specific and pointed data is given on etiology, pathologic development and histologic changes to help make your diagnoses more effective and inclusive. Virtually every conceivable dental lesion is shown in the nearly 1000 illustrations.

The current concepts of diagnostic procedure as set forth in this new edition will do much to fill the needs of your practice.

By KURT H. THOMA, D.M.D., F.D.S.R.C.S., Eng., Hon. F.D.S.R.C.S. Edin., Professor of Oral Surgery, Emeritus, and Brackett Professor of Oral Pathology, Emeritus, Harvard University; Lecturer on Oral Surgery, The Graduate School of Medicine, University of Pennsylvania; and HAMILTON B. G. ROBINSON, D.D.S., M.S., associate Dean and Professor of Dentistry (Oral Pathology and Diagnosis), College of Dentistry, Ohio State University; Professor of Oral Pathology, College of Medicine, Ohio State University. About 584 pages, 6" x 9" with 928 illustrations (55 in color). About $11.50. *New (4th) Edition*—Just Ready!

Clinical Periodontology

By Glickman

A day-to-day working manual that helps you to treat the entire mouth instead of merely the localized disorder. The principles and methods shown here are applicable to all phases of dentistry—operative dentistry, prosthodontics, orthodontics, oral surgery, etc.

Preventive, pharmacologic, nutritional, and surgical measures are explained in step-by-step detail. The pages are packed with practical topics such as sharpening of instruments, correct position of operator, treatment planning, latest antibiotics, instruction of patient in oral physiotherapy, etc. 742 beautifully clear illustrations scarcely permit you to go astray in the technics described.

By IRVING GLICKMAN, B.S., D.M.D., F.A.C.D., Professor of Oral Pathology and Periodontology and Director of the Division of Graduate and Postgraduate Studies, Tufts College Dental School, Boston. 1019 pages 6½" x 9¼", with 1253 illustrations on 742 figures. $15.00.

Order now for 30 day free examination!

W. B. SAUNDERS COMPANY, West Washington Sq., Phila. 5

Send for 30-day examination and charge: ☐ Easy Payment Plan ($3.00 month)

☐ Thoma & Robinson's Oral Diagnosis.....About $11.50

☐ Glickman's Clinical Periodontology 15.00

Name.....

Address.....

ADA 7-55

another new development
by TICONIUM...

the

Stress-o-graph

Pat. Pend.

The Ticonium Stress-o-graph takes the guesswork out of designing.

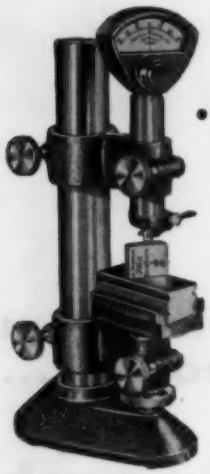
Now for the first time, the Stress-o-graph with its Micro-Meter gauge accurately records with a fine ink line the degree of undercut on a partial. A Magna-Mount table insures accuracy on every case.

This precision instrument is also used in the design of Westgard "Stressguard" partials. The Stress-o-graph is only available to Ticonium laboratories.

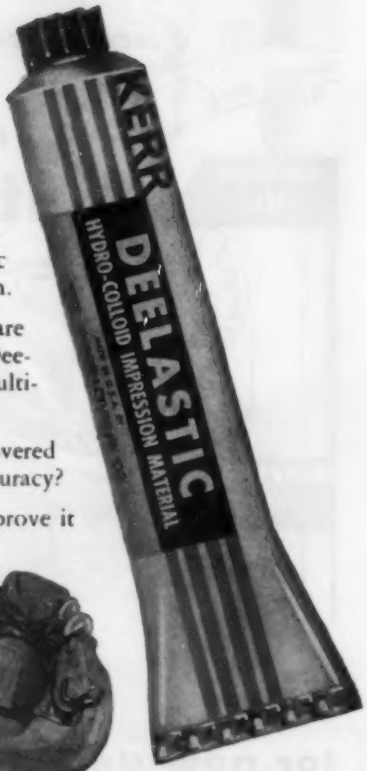
TICONIUM
413 No. Pearl St., Albany 1, N. Y.

for new developments, look to

TICONIUM



. . . world standards for accuracy



Just as Johansson Gage Blocks are the World-Standard for Accuracy in the engineering industry, so is Kerr Deelastic Hydro-Colloid in the Dental Profession.

That's why more and more dentists are using Deelastic—confident that only Deelastic Impressions can produce the ultimate in Accuracy of Fit.

Are you one who hasn't yet discovered this Perfectionists' Product for Accuracy?

A phone call to your Dealer will prove it to your own satisfaction.

KERR MANUFACTURING COMPANY • *ESTABLISHED 1891* • DETROIT 8, MICHIGAN

KERR DEELASTIC HYDRO-COLLOID

Ash

has FORCEPS for every need!

ASH

Ash 74N
Lustra Stainless Steel

For Crowded Lower Anteriors

OR

For Lower Anteriors and Roots

Ash 74M
Lustra Stainless Steel

DON'T BE MISLED . . . . Insist on authentic ASH Forceps, not just a copy of a famous ASH pattern. Look for the name "ASH ENGLAND" on the handle or beak.

Claudius Ash, Sons & Co., U.S.A., Inc.
309 Main Street, Niagara Falls, N. Y.

50 Years of Customer Satisfaction

BEHIND EVERY BOTTLE OF

FELLOWSHIP ALLOY

"Favorite Alloy throughout the World"

This Old Reliable Product — long the leader among all alloys—is compounded under the most modern technical methods available to modern dental science.

- Amalgamates smoothly . . . quickly
- Exceptional contraction-expansion control
- Polishes beautifully white
- Maximum compressive strength
- Provides strong, lasting margins
- 69% silver content
- Certified to comply with A.D.A. Spec. No. 1

Supplied in fast, medium and slow-setting Shavings or Filings

1 ounce bottles		5 ounce bottles	
1 bottle	$2.45 per oz.	1 bottle	$2.30 per oz.
5 bottles	$2.30 per oz.	5 bottles	$2.10 per oz.
10 bottles	$2.15 per oz.	10 bottles	$2.00 per oz.

With purchase of each 10 ounces, one 1 oz. bottle FREE!

MANUFACTURED BY THE DENTAL PROTECTIVE SUPPLY COMPANY

Please send me ..... bottles of ..... oz. Fellowship Alloy.

Name .....

Address .....

.....

Dealer's Name .....

☐ Filings ☐ Shavings ☐ Medium Setting ☐ Fast Setting ☐ Slow Setting

SOLE DISTRIBUTOR:

THE J. BIRD MOYER CO., Inc.
117-21 NORTH FIFTH STREET
Philadelphia 6, Penna., U. S. A.

60 Years of Dedication to the Dental Profession

SEE THE PELTON and SEE . . . *really SEE!*

What do illuminating engineers advise for ideal dental office lighting?

1) *General lighting of the office should be maintained at a minimum of 50 foot-candles.**

This can be obtained by any one of many suitable ceiling units available at your supply company.

2) *Supplementary lighting of the oral cavity should be provided by an operating light that may be used in a multiplicity of positions to provide 150 to 1,000 foot-candles of illumination for average tasks within the mouth.**

This requirement is easily met with the Pelton Dental Light by varying the distance between the light and the mouth. Only with the Pelton is this adjustment of the intensity of light possible with so little effort.

No other light covers such a wide variation of positions with no drift so easily, so smoothly, so free of discomforting glare and shadows as this new Pelton Dental Light.

**Report by Illuminating Engineering Society.*

Yes, see the Pelton . . . and really see.
At your dealer's or write for brochure.

Professional Equipment Since 1900

PELTON

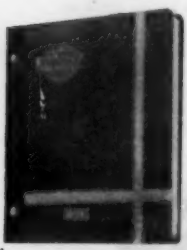
THE PELTON & CRANE CO. • DETROIT 2, MICHIGAN

Record Book for Dentists

Your 1956 DAILY LOG for Dentists is off the press and ready for scheduling your new year's work. This complete one-volume financial record book assists in more efficient practice management—helps you avoid tax troubles—saves you time and money. Names of patients, services performed, amounts charged and cash received are all listed on DATED Daily Pages. All expenses itemized for easy tax reference. All record forms designed *specifically for your profession*. Now is the time to order your DAILY LOG—the most practical and easy-to-use bookkeeping system yet devised for your profession.

Price: $7.25 for CALENDAR YEAR

SATISFACTION GUARANTEED



MAIL COUPON TODAY!

Colwell Publishing Co.
262 University Ave.
Champaign, Illinois

☐ Please send me 1956 Daily Log for Dentists on approval. Remittance enclosed.

☐ Send more complete details along with FREE Record Supplies Catalog.

Dr.....

Address.....

City.....State.....

The right combination for maximum protection

Valuable papers, confidential records, narcotics or dangerous drugs . . . they're all at *your* finger-tips, but perfectly concealed and safe from outside eyes and fingers. Yes, it's the exclusive Invincible Concealed Safe unit that provides convenient security PLUS the utility of an attractive, durable Invincible Filing Cabinet.

Choose the Invincible Concealed Safe Unit in either the desk-high, counter-high, or standard four-drawer filing cabinet. Choice of letter or legal size, with or without a general lock for file drawers.

Ask your office furniture dealer or write

INVINCIBLE®

INVINCIBLE METAL FURNITURE CO., Manitowoc, Wis.

FREE TECHNICAL LITERATURE

Check the plastic products in which you are interested. Attach your professional card, and mail. We will send you the latest technical information on:

JUSTI

Products for Better Dentistry

- ☐ S.R. acrylic denture teeth.
- ☐ S.R. characterized anteriors.
- ☐ Four types of posteriors *including short-bites.*
- ☐ Justi acrylic facings.
- ☐ Justi-tone denture base material.
- ☐ S.R. denture base material.
- ☐ Justi Liqua-Color.
- ☐ C.B.F.—crown and bridge material.
- ☐ Gol-Shank tungsten carbide burs *cross-linked* *28 sizes—A.H.P. and S.H.P.*
- ☐ Justi anti-bacterial acrylic cement.
- ☐ Justi anti-bacterial reline material.
- ☐ Justi Muco-Seal.

S&R

H. D. JUSTI & SON, INC.
3143 Spring Garden St. • Phila. 4, Pa.

Add this free reference work to your professional library

You know the old saying, Doctor. "You can't judge a book by its cover."

Well, that certainly applies to "Platinum-Palladium-Gold in Dentistry." Because . . . behind the plain cover of *this* book is a very handy reference work. 40 well-organized pages that classify and simplify the data on precious metals.

This book describes the properties and characteristics of the dental alloys. Outlines their suitability for different types of prosthetic dentistry and orthodontia. Defines the mechanical properties of dental golds. Points out their significance. Lists sources of supply.

You'll find it a valuable addition to your professional library, Doctor. Just use the coupon for your free copy.

A-7

Platinum Metals Division
THE INTERNATIONAL NICKEL CO., INC.
67 Wall Street, New York 5, N. Y.

Please send me my free copy of "Platinum-Palladium-Gold in Dentistry."

Name_____

Street_____

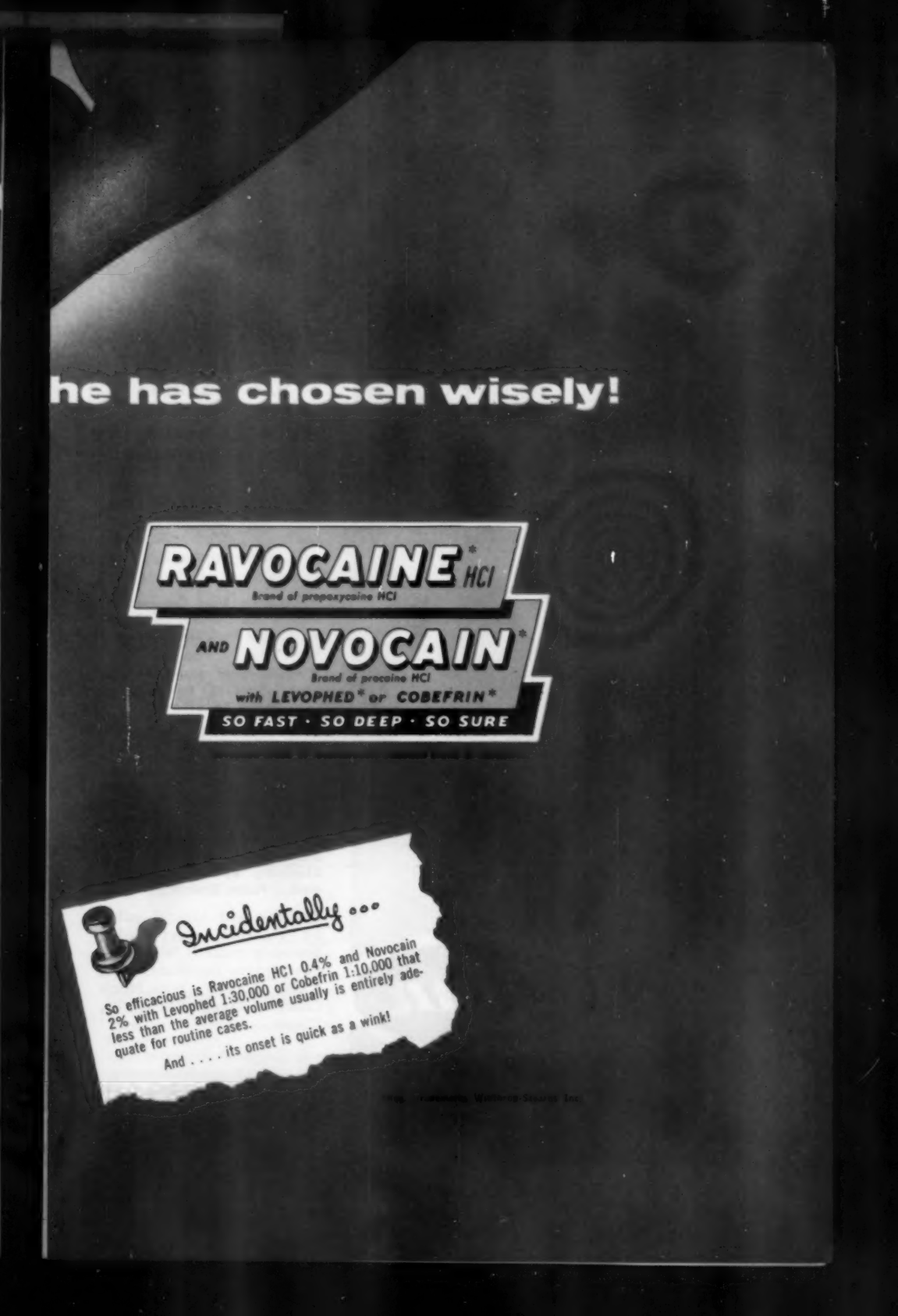
City_____

State_____

Platinum Metals Division

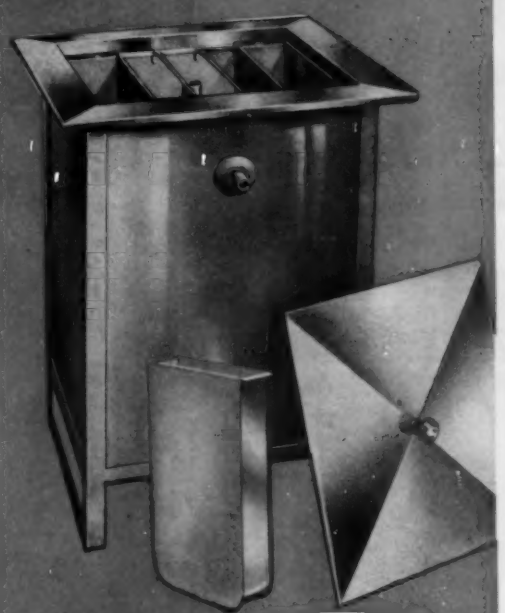
THE INTERNATIONAL NICKEL COMPANY, INC. *67 Wall Street, New York 5, N. Y.*

Carpule
RAVOCAINE
NOVOCAIN
COOK-WAITE


he has chosen wisely!
RAVOCAINE* HCl
Brand of propoxycaine HCl
AND NOVOCAIN*
Brand of procaine HCl
with LEVOPHED* or COBEFRIN*
SO FAST · SO DEEP · SO SURE
Incidentally ...
So efficacious is Ravocaine HCl 0.4% and Novocain 2% with Levophed 1:30,000 or Cobefrin 1:10,000 that less than the average volume usually is entirely adequate for routine cases.
And .... its onset is quick as a wink!

NEW·· RINN X-RAY

Developing Tank



RINN RESEARCH HAS PRODUCED THIS SHORT CUT TO MORE ACCURATE FILM PROCESSING

This lustrous stainless steel tank, precision engineered, assures improved radiographic processing and saves time because . . .

- **Stainless Steel Construction. More Rapid Thermal Conductivity. Longer Tank Life. Corrosion Resistant.**
- **Removable Stainless Steel Inserts. Faster Disposal of Exhausted Solutions.**
- **Insulated Outer Jacket. Improved Temperature Control.**
- **Improved Construction. Heliarc Welded. No Warping. No Leaking Seams. No Pitting. No Leaking Corks.**
- **Time Saving. Larger Area — Doubles Hanger Space. Easier Cleaning. Removable Standpipe — Faster Draining.**

Available with either 1 gallon or ½ gallon Insert Tanks. Sensibly priced. Write for descriptive literature. Rinn X-Ray Products, 2929 North Crawford Avenue, Chicago 41, Illinois.

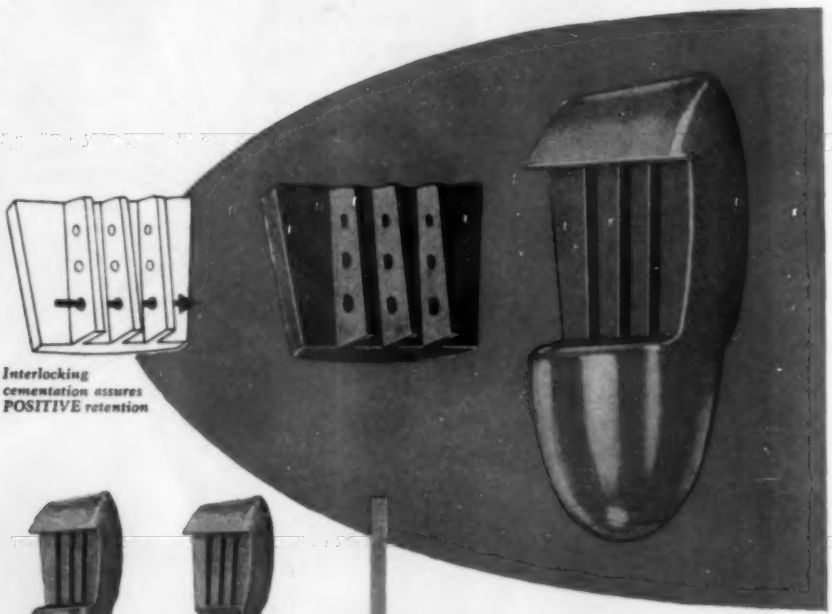
Rinn

LEADERS IN DEVELOPMENT OF DENTAL X-RAY TECHNIQUES AND PRODUCTS

You gain

Versatility! Strength! Beauty!

with D-P Lamell Facings for crown and bridgework



Interlocking cementation assures POSITIVE retention

Facing shaped to saddle type.

Facing shaped to ridge-lap type.

The universal non crazing plastic facing that may be shaped, characterized, ground and polished as desired, with no reglazing required.

WRITE for FREE Technic Sheet on D-P Lamell Facings, or call your Dental Dealer for full information TODAY.

outstanding advantages:

TREMENDOUS STRENGTH—Far exceeding anything in your experience!

GREAT DURABILITY—No chipping, no cracking.

INTERCHANGEABILITY—The most practical interchangeable facing made.

AESTHETIC BEAUTY—Life-like appearance.

SIMPLE TECHNIC—Using familiar procedures.

dental perfection co., inc.

543 West Arden Ave. • Glendale 3, California

SANDBLAST A
WERNET'S DENTU-CREME AN

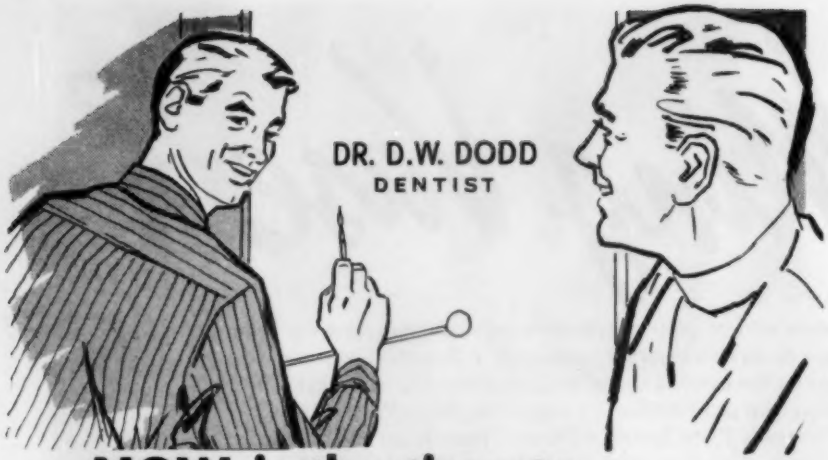
Ming Vase?

Priceless ancient pottery calls for careful cleaning, lest the beautiful surface finish be irreparably damaged. • Beautiful dentures, too, can be ruined by the careless use of inappropriate cleansing agents. You can help protect them by suggesting Wernet's Dentu-Creme and Wernet's Plate Brush. • Dentu-Creme is smooth, absolutely non-injurious, and an excellent detergent. The special polishing agent it contains makes it ideal for use on acrylics. • Wernet's Plate Brush, with the Easy Grip Handle, conforms to professional specifications. Its divided tufts of fine bristles are individually wired-in for long life. Its black bristle section is used on the ridge and the vault—its white bristle section on the teeth and interproximal surfaces. • For safe, yet thorough removal of mucin plaques, food particles and stubborn stains, suggest Wernet's Plate Brush and Wernet's Dentu-Creme.

WERNET DENTAL MFG. CO., INC.

Dept. 15-G Jersey City 2, N. J.

WERNET'S PLATE BRUSH



NOW is the time to join the A.D.A Group Plan

The A.D.A. group plan is designed to give members under age 50 outstanding life insurance value. Underwritten by Great-West Life, the plan offers maximum protection at minimum cost at a time when family responsibilities are heaviest and income is lower than it will be later on.

The plan provides **$5,000** Basic Life Insurance Protection or **$10,000** for Accidental Death at an annual premium of

$21.00 to age 30; $26.50 from ages 31-40; $42.00 from ages 41-50.

(After age 51 premium becomes 65.50 but does not increase thereafter. Instead, the amount of life insurance decreases annually from age 53.)

Conversion privileges and many additional advantages are available. For further details send coupon below.

MAIL TODAY!

THE
GREAT-WEST LIFE
ASSURANCE COMPANY
HEAD OFFICE - WINNIPEG, CANADA

OVER 13,000 A.D.A. MEMBERS NOW ENROLLED

DR. FRED A. RICHMOND, ADMINISTRATOR
Group Life Insurance Plan, 861 Brotherhood Building, Kansas City 1, Kansas

Please send me, without obligation, further details on the A.D.A. Group Life Plan.

Name.....

Address.....

Age.....

HAWAII

OFFICIAL PROGRAM
HONOLULU COUNTY DENTAL SOCIETY

PAN-PACIFIC DENTAL CONFERENCE

OCTOBER 24-25, 1955

IMMEDIATELY FOLLOWING THE A.D.A. ANNUAL SESSION IN SAN FRANCISCO

This is the only program officially connected with the Pan-Pacific Dental Conference; it is the Honolulu County Dental Society's official tour for visiting dentists. The scientific sessions and the President's No-Host Reception are open to all A.D.A. members. However, dentists wishing to enjoy the other parties, sightseeing trips, native entertainment, shows, dinners, inter-Island tours, and special events organized by the Islanders for visiting dentists can do so only by joining this official tour of the Honolulu County Dental Society.

10 DAYS 10 NIGHTS **$385** **PLUS $30 TAX**

TOUR PRICE INCLUDES: Roundtrip transportation via either Pan American or United Air Lines, residence at Waikiki Beach, and all the sightseeing, social activities, and special events arranged by the Honolulu County Dental Society for visiting dentists.

RESIDENCE: Individual members designate their choice of hotels: Royal Hawaiian, Surf Rider, Princess Kaiulani, Moana, Reef, Edgewater, Halekulani, or Waikiki Biltmore hotels.

TRANSPORTATION AND DATES: Departure: Friday or Saturday, October 20 or 21. Return: Sunday or Monday, October 30 or 31. Individual members may designate other dates, including choice of Lurline travel.

Consult Your Travel Agent or Write to:

PAN-PACIFIC DENTAL CONFERENCE
PROFESSIONAL BUILDING
3124 EAST 14th STREET
OAKLAND 1, CALIFORNIA

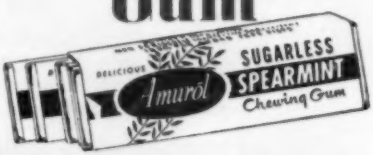
---

for caries-active patients *prescribe*

Amurōl

NON-CARIOGENIC

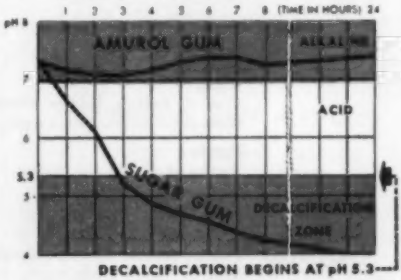
Sugarless Gum



Sold through drug, department and health food stores. Samples and literature on request. Please give druggist's name, address.

AMUROL PRODUCTS COMPANY
116 S. MICHIGAN AVE., CHICAGO 3, ILL.

Comparative *in vitro* Effects of Sugar Gum and Amurol Gum added to Saliva

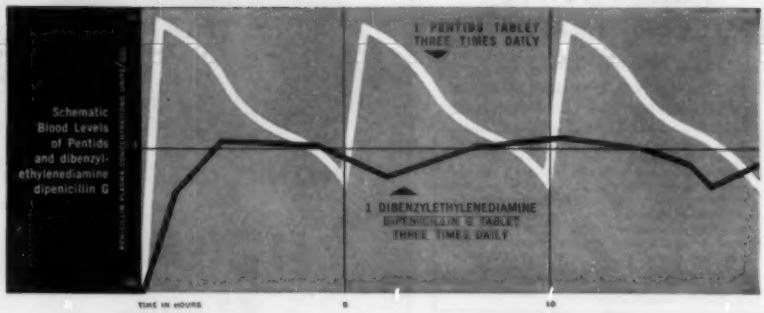


As shown above, pH of carries-active saliva *in vitro* remains in alkaline zone for hours with AMUROL SUGARLESS GUM, whereas with sugar gum the pH drops to the acid level under the same conditions.

just **1** or **2** Pentids Tablets three times daily

as adjunctive therapy

for the more common dental infections


Schematic Blood Levels of Pentids and dibenzylethylenediamine dipenicillin G
1 PENTIDS TABLET THREE TIMES DAILY
1 DIBENZYLETHYLENEDIAMINE DIPENICILLIN G TABLET THREE TIMES DAILY
TIME IN HOURS
0
10

Pentids are particularly effective as adjunctive therapy for acute oral Vincent's disease, pericoronitis, alveolitis, dento-alveolar abscess, cellulitis, and osteomyelitis. Also for prophylaxis before and after extraction and other dental surgery.

When pre-existing cardiac lesions predispose to sub-acute bacterial endocarditis or there is extensive tissue trauma, parenteral penicillin should be given before or at time of extraction followed by Pentids postoperatively.

PENTIDS

(Squibb 200,000 Units Penicillin G Potassium)

TABLETS

Dosage:
1 or 2 Pentids Tablets three times daily ½ hour before meals.

Supply:
Bottles of 12 and 100 tablets.

Also Available:
Pentids-Soluble Tablets, 200,000 units of soluble penicillin G.

SQUIBB

"PENTIDS"® IS A SQUIBB TRADEMARK

CAPSULES—NEW! FOR CHILDREN

Dosage:
Contents of 1 or 2 Pentids Capsules three times daily ½ hour before meals.
Pentids Capsules are opened and their soluble penicillin is added to approximately 2 ounces of milk, fruit juice, ginger ale or similar vehicles.

Supply:
Bottles of 24 and 100 capsules.

THE EMBLEMS OF RELIABLE PROTECTION
SINCE 1902

We cordially invite your inquiry for application for membership which affords protection against loss of income from accident and sickness (accidental death, too) as well as benefits for hospital expenses for you and all your eligible dependents.

all premiums come from → PHYSICIANS SURGEONS DENTISTS ← all benefits paid to

PHYSICIANS CASUALTY
AND
HEALTH ASSOCIATIONS
Omaha 2, Nebraska
$4,500,000 ASSETS
$22,500,000 PAID FOR BENEFITS

for
caries-active
patients

recommend
non-cariogenic

Amurol®

Sugarless
Mints

REFRESHING MINT FLAVOR!
Deliciously sweet, but free from sugar. Available through drug, department and health food stores.

Samples and literature on request.
Please give druggist's name and address.

AMUROL PRODUCTS COMPANY
116 S. Michigan Ave., Chicago 3, Ill.

A *NEW* LIFE-LINE
in RESTORATIVE DENTISTRY

Pulpdent® LIQUID*
ROWER

(Brand of CALCIUM HYDROXIDE SUSPENSION)

Used as a cavity liner, PULPDENT (Rower) LIQUID neutralizes cement acids and minimizes thermal shock. In cases of pulpal exposure, it also aids in forming secondary dentin.

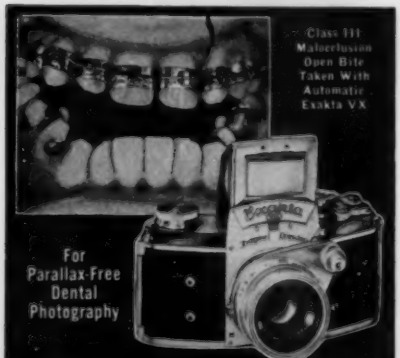
Dispensed in 15cc polyethylene squeeze bottles; available at leading dental supply houses.

Accepted — Council on Dental Therapeutics — American Dental Association

ROWER DENTAL MFG. CORP. Boston 16, Mass. U.S.A.

Group A Classification announced J.A.D.A. 50:334 (Mar.) 1955

*Also available at dental supply houses; PULPDENT (Rower) PASTE (Brand of Calcium Hydroxide Paste), especially suitable in vital pulpotomy and in pulp capping.



AUTOMATIC EXAKTA VX
35-mm. Single Lens Reflex Camera
with f/2.0 Automatic Westagon Lens

For easily made dental photographs and, faithfully reproduced oral conditions—facilitating case recording in oral pathology, surgery, orthodontics and full mouth rehabilitation . . . an invaluable aid in patient education. New AUTOMATIC Lens, when fully stopped down permits focusing and viewing without annoying the patient with modeling lights. In addition, you can use the Exakta for personal photography, sports, portraits, copywork, etc.

FREE! Write Dept. 106 for Free Descriptive Booklet "B" on Camera & Accessories and Brochure on Close-Up Technique with Automatic Exakta VX.

EXAKTA CAMERA COMPANY
705 Bronx River Rd., Bronxville 8, N. Y.

"YORICK"
Skull is 3½" x 2¼"

Price
$15.00

With This Miniature Ivorine Skull You Can SHOW Patients What You're Talking About

Invaluable in Educating Patients to Accept Your Concepts of Advanced Dental Service. Suggestions on Its Use Accompany Skull.

If you do not have our Catalog No. 33, write for your copy today.

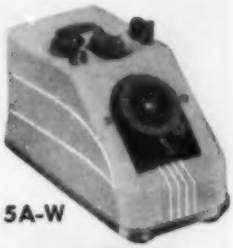
COLUMBIA DENTOFORM CORPORATION
"The House of A Thousand Models."
131 East 23rd Street New York 10, N. Y.

Convert your old WIG-L-BUG (Patented)

Model 3A

into

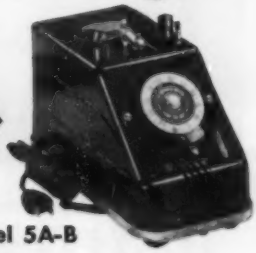
an up-to-the-minute, bright, WHITE model . . $39.50



Model 5A-W

or

a shiny, BLACK, streamlined model . . $34.00



Model 5A-B

F. O. B. Factory

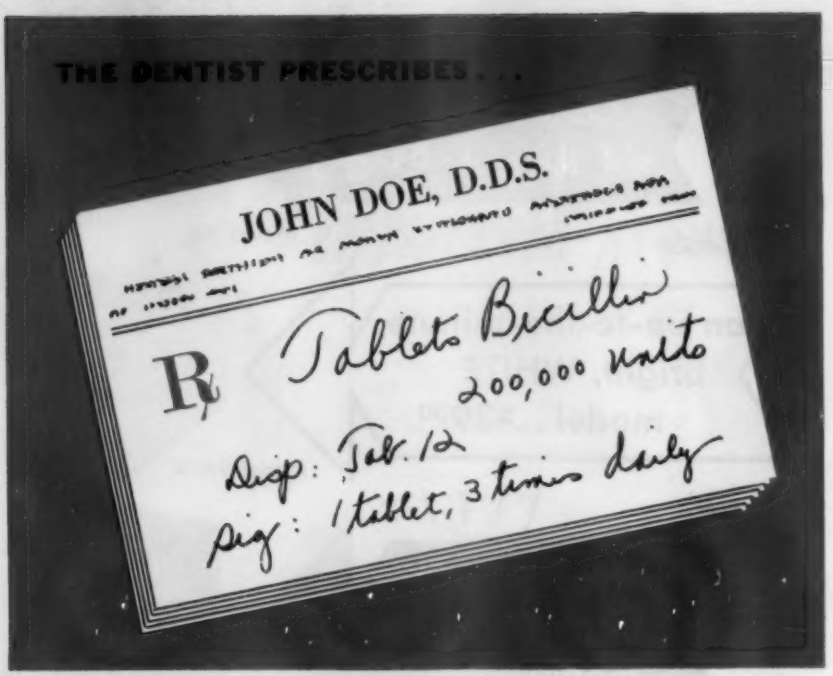
To bring your old Model 3A Wig-l-bug right up to date, ship it to Crescent. We check and clean thoroughly. We replace the mechanical timer with a new electric timer. We completely overhaul the motor, supply new wires where required. And we remount the mechanism in a new bright, white housing . . . *or* a new lustrous, black housing *whichever YOU prefer*. This offer only to 110 volt, 60 cycle machines. The cost? Only $39.50 for the change-over to the new white housing, only $34.00 to the new black housing. F.O.B. Factory.

If you have a Model 5A Black Wig-l-bug and want to change over to a white housing your dealer salesman can do it for you. White Housing only $10.00, F.O.B. Factory. If Black Housing is returned a credit of $5.00 is allowed against above prices.

Have the conversion made while you are away on your vacation to avoid being without the use of your Wig-L-Bug. Delivery in about 2 weeks.

CRESCENT DENTAL MFG. CO.

1839 S. Pulaski Road, Chicago 23, Illinois



He prescribes Oral BICILLIN because: "Oral administration of 200,000 to 300,000 units of benzathine penicillin G [BICILLIN] every 6 to 8 hours will produce adequate blood levels for the treatment of most penicillin-sensitive infections. . . ."[1] In both prophylaxis and adjunctive treatment, Oral BICILLIN offers prolonged antibacterial blood levels, resistance to gastric destruction, maximal safety, convenient dosage regimen.

1. Council on Dental Therapeutics: J.A.D.A. 49:715 (Dec.) 1954

PRESCRIPTION PADS ON REQUEST

Supplied: Tablets, 200,000 units, vials of 36; 100,000 units, bottles of 100. Oral Suspension, 300,000 units per 5-cc. teaspoonful, bottles of 2 fl. oz.; 150,000 units per 5-cc. teaspoonful, bottles of 2 fl. oz.

Accepted COUNCIL ON DENTAL THERAPEUTICS AMERICAN DENTAL ASSOCIATION

TABLETS SUSPENSION

Oral BICILLIN®

Benzathine Penicillin G (Dibenzylethylenediamine Dipenicillin G)

Wyeth® Philadelphia 2, Pa.

Penicillin with a Surety Factor

ARTHRITIC DENTAL PATIENTS NEED SPECIAL ATTENTION

Dental patients who have arthritis merit this attention because arthritics who take aspirin are actually 3 to 9 times more susceptible to stomach upsets than the general population.

Recent reports,[1,2] have indicated that 27% to 42% of arthritics suffer nausea, dyspepsia or anorexia when they take aspirin. Yet 70% of those with proved intolerance to aspirin experienced no unpleasant after-effects with BUFFERIN, even in heavy doses.

BUFFERIN, therefore, is the analgesic of choice. It is far better tolerated than aspirin. It is faster acting—the salicylate is absorbed *twice* as fast as aspirin.

All of your patients will appreciate the routine use of BUFFERIN *before* operative procedures are undertaken as well as for post-operative comfort.

BUFFERIN® contains acetylsalicylic acid (5 gr. per tablet), for prompt analgesia, plus magnesium carbonate and aluminum glycinate. *Available* in bottles of 12, 36, 60 and 100 tablets.

References: 1. J.A.M.A. 158:386 (June 4) 1955. 2. Brit. M. J. 1:1223 (May 29) 1954.

BUFFERIN® Acts Twice as Fast as Aspirin Does Not Upset the Stomach

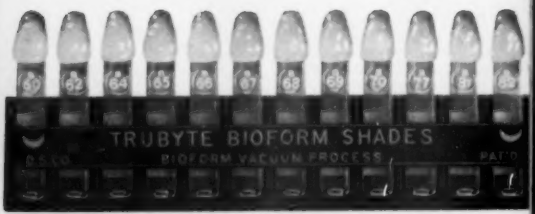
BRISTOL-MYERS PRODUCTS DIVISION

BRISTOL-MYERS CO., 19 W. 50 St., New York 20, N. Y.

B stands for Blonde

blonde, [F., < L.L. blondus, yellow], 1. blond; 2. blond, a. 1, having a fair skin, light (usually blue) eyes, and fair hair; xanthochroic: said of a person; 2, flaxen or golden; said of hair.

B also stands for Bioform®



WHEN YOU SPECIFY TOOTH SHADES . . .
SPECIFY B FOR BIOFORM

. . . and whether your patient is blonde, brunette or redhead, you'll find there's always a suitable shade for every age and complexion in Trubyte Bioform.

Trubyte Bioform shades have a *natural*, radiant vitality and *natural* shading which compare most favorably with healthy natural teeth. Your Trubyte Bioform shade guide is the key to the most natural appearing shades in artificial teeth. Start specifying "B For Bioform" today and you'll note immediately the improved esthetic appearance of your complete and partial denture cases.

TRUBYTE Bioform® THE FIRST VACUUM FIRED PORCELAIN TEETH

ASK YOUR TRUBYTE DEALER to show you the "10 Features of Trubyte Bioform Color Superiority"

THE DENTISTS' SUPPLY COMPANY of N. Y.
York, Pennsylvania